LOUISIANA DEPARTMENT OF WILDLIFE & FISHERIES

OFFICE OF FISHERIES

INLAND FISHERIES SECTION

PART VI-A

WATERBODY MANAGEMENT PLAN SERIES

LAKE BISTINEAU

LAKE HISTORY & MANAGEMENT ISSUES

CHRONOLOGY

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LAKE HISTORY

GENERAL INFORMATION

Date Lake Formed

Lake Bistineau and several other lakes along the Red River corridor were formed by the "Great Raft" on the Red River which consisted of a series of obstructions formed by logs, driftwood, mud, sand, and other debris. The log jam may have begun forming as early as 1100- 1200 A.D. These "rafts" impaired the flow of the Red River from just above Natchitoches to the vicinity of Fulton, Arkansas. During the period of the 1400's and 1500's, the waters of the Red River overflowed its banks and many backwater areas were greatly enlarged, including Bayou Dorcheat, Lake Bistineau, and Loggy Bayou. As the massive log jam continued to grow in size over the years, the current increased significantly in Bayou Dorcheat and Lake Bistineau during the 1700's.

Impoundment

The original Lake Bistineau impoundment dam was constructed in 1938 by placing an earthen dam across Bayou Dorcheat approximately 8 miles west of Ringgold, creating a lake level of 137 feet NGVD (National Geodetic Vertical Datum). In 1951, the earthen dam was raised, and the spillway was improved. These additions created the current lake level of 141 feet NGVD and impounded an area encompassing 17,200 acres.

Ownership

Lands lying below the 148.6' NGVD contour (the "meander line") are considered to be part of the "Lake Bistineau Game and Fish Preserve," and surface rights are supposed to be under state control. Roughly half of the lake bottom is owned by the state; the remainder is in private ownership. Over the years, there have been many issues with land ownership in and around Lake Bistineau, including litigation involving the U.S. Government. For more details, see "Lake Bottom and Shoreline Property Ownership" in the "Problems and Events" section.

Purpose for Creation

Act 43 of 1930 establishes Lake Bistineau and designates the area around the lake below the meander line (148.6' contour) as the Lake Bistineau State Game and Fish Preserve. Although no specific purpose is stated for the creation of the lake, much of the language points towards creating an area for people to enjoy outdoor recreation, primarily hunting and fishing. The Lake Bistineau Game and Fish Commission was created by this act and established as the controlling authority for the game and fish preserve.

See Authorization below.

Size (surface area)

17,200 acres @ 141' NGVD

10,622 acres@ 134.25'NGVD based on estimate during 2009 drawdown.

Watershed

The watershed is 1,443 square miles or 923,520 acres. The ratio of watershed to lake surface area is 53:1.

Watershed characteristics: Bayou Dorcheat is the main tributary to Lake Bistineau. Other tributaries include Clark's Bayou and Brushy Creek, as well as several smaller creeks around the lake. Bayou Dorcheat is a 122-mile-long meandering stream that extends from Nevada County in southwestern Arkansas through Columbia County and across the state line into Webster Parish before emptying into Lake Bistineau. Bayou Dorcheat is listed as a scenic stream in Louisiana and remains one of the few, mostly intact riverine floodplains in the area. The terrain in the watershed is low, yet hilly in areas out of the floodplain and consists primarily of fertile farmland, pasture land, timberland, and swamp land. Timber type ranges from pine in the upland, higher elevations to bottom land hardwoods interspersed with cypress swamps in the lower elevation floodplain.

The lower reaches of Bayou Dorcheat near its confluence with Lake Bistineau have been impacted by the Gifford-Hill gravel mining operations. Here, sand and gravel were excavated from shallow strip mines up until 1978, when the U.S. Army Corps of Engineers (USACOE) issued a cease and desist order to halt the operations. The mining operations were in violation of the Federal Water Pollution Control Act. Most of the areas affected by the mining operations remain as they were when the activities ended, and no restoration efforts have been made.

Pool Stage

Surface elevation of Lake Bistineau is set at the spillway elevation of 141' NGVD.

Parishes

Bienville, Bossier, Webster

Spillway Width

The spillway is a 1,200 feet long reinforced-concrete, broad-crested design and is located on the west side of the dam.

Drawdown description

A 121 feet long headgate structure is located at the extreme west end of the spillway. Included in the headgate structure are 12 steel sluice gates made by Rodney Hunt Company measuring 6.0 ft. x 6.0 ft. with mechanical lifts. These gates allow the lake to be lowered 8 feet or to 133' NGVD.

Who Controls

The Louisiana Department of Transportation and Development (LDOTD) are charged with operation and maintenance of the control structure and dam on Lake Bistineau.

LAKE AUTHORITY

Authorization

The Lake Bistineau State Game and Fish Preserve was established by Act 43 of 1930, which placed Dorcheat Bayou and the naturally formed Lake Bistineau in a game and fish preserve: *The Lake Bistineau State Game and Fish Preserve was created out of Dorcheat Bayou and Lake Bistineau*

situated in the Parishes of Bienville, Bossier, and Webster, south of the Dixie-Overland Highway (old Hwy. 80) between Shreveport and Minden in Webster Parish, and extending south in Township Fifteen (15) and into Bossier and Bienville Parishes and the territory comprising the preserve shall be all that land along Dorcheat Bayou and Lake Bistineau below mean high water mark as shown by the meandering lines as now of record (148.6' NGVD Meander Line), until new lines and boundary be defined by surveys made under the supervision of the Department of Conservation, and the Commission in charge of this Lake Bistineau State Game and Fish Preserve shall have authority and control extending one-half (1/2) mile beyond such boundary lines now established, or that may be established. The Lake Bistineau State Game and Fish Commission shall have control of all of Dorcheat Bayou and over tributary streams for three (3) miles from the boundaries of the game and fish preserve.
Act 43 does not provide a purpose for creation of the lake as it was already naturally formed, but does provide*: the authority for the creation of the Lake Bistineau Game and Fish Commission, which is provided with the authority to erect and maintain the game and fish preserve under the control of the Department of Conservation, administer and govern the preserve, incur debt, issue bonds, levy taxes, promulgate rules and regulations, purchase or expropriate property, provide for the expropriation of surface rights of privately owned property, erect and maintain dams within the boundaries of the game and fish preserve and other duties and powers as provided in Act 43.* The full act can be viewed in APPENDIX I of MP-C Typemaps and Archives.

Act 64 of 1942 amended and re-enacted sections 3 and 11 of the original Act 43 of 1930 to provide: *the Lake Bistineau Game and Fish Commission under the supervisory control of the Department of Conservation the full right to administer, regulate, and control the game and fish preserve and a hunting and fishing area except as to the minerals and mineral rights. The commission shall have the power and authority to regulate and control the taking of game or fish from the preserve, establish closed seasons, fix game and fish limits, employ wardens, build roads, provide camps and boats, fix fees for hunting or fishing in the preserve in addition to fees for state licenses, to make and enforce rules and regulations, to buy, lease, or sell property, to lease or let the privilege of commercial fishing, employ all labor necessary, establish fish hatcheries, and to do any and all things necessary to the propagation and conservation of game and fish in the preserve.* Act 64 also provides some specific rules and regulations governing hunting and fishing in the preserve and prohibits any building to be used as living quarters on the preserve. The full act can be viewed in APPENDIX II of MP-C Typemaps and Archives.

The Lake Bistineau State Fish and Game Commission was abolished by Act 152 of 1969 and the functions, property and authority transferred to the Louisiana Wildlife and Fisheries Commission.

Wildlife and Fisheries Commission authority and the Lake Bistineau State Game and Fish Preserve were transferred to the Louisiana Department of Wildlife and Fisheries in RS 36:610 as follows: *The following agencies,(including the Lake Bistineau State Game and Fish Preserve) as defined in R.S. 36:3, are hereby placed within the Department of Wildlife and Fisheries and shall exercise and perform their powers, duties, functions, and responsibilities as provided for agencies transferred in accordance with the provisions of Part II of Chapter 22 of this Title*. The full acts describing the transfer can be viewed in APPENDICES III and IV of MP-C Typemaps and Archives.

Access

Contour maps of the lake are available for purchase online or at local retail stores. Ramp descriptions and location coordinates are found in Table 1.

Table 1. Lake Bistineau boat ramp names, locations and descriptions.

Ramp Name	Coordinates	Inaccessible Below Pool @	Ramp	Parking
Hwy 80—Dorcheat Public Ramp (Dixie Inn)	N 32° 35.832' W -93° 20.001'	2.97'	Concrete	Asphalt—25 Trailers
Hwy 164—Webster Public Ramp	N 32° 32.213' W -93° 19.848'	Accessible In Drawdown	Concrete	Gravel—25 Trailers
Westwood Camp Pay to Launch—$2.00	N 32° 30.657' W -93° 22.197'	4.35'	Concrete	Gravel—15 Trailers
Burge's Camp Pay to Launch—$3.00	N 32° 30.657' W -93° 21.454'	5.38'-small crafts can be launched from earthen area adjacent to launch during drawdowns	Concrete	Roadside—5 Trailers
State Park Area 2 (closed unless renting group camp)	N 32° 27.580' W -93° 21.490'	2.97'	Concrete	Asphalt—20 Trailers
State Park Area 1 Pay to Launch-$2.00	N 32° 26.373' W -93° 22.701'	2.97'	Concrete	Asphalt—30 Trailers
Plum Orchard Pay to Launch—$3.00	N 32° 24.738' W -93° 22.955'	5.38'	Concrete	Gravel—15 Trailers
Green Park Pay to Launch—$3.00	N 32° 24.575' W -93° 23.518'	4.35'	Concrete	Gravel/Roadside—10 Trailers
Camp Joy Pay to Launch—$3.00	N 32° 24.646' W -93° 26.448'	5.38'	Concrete	Asphalt/Gravel—10 Trailers
Pine Cove Marina (Membership Required)	N 32° 22.936' W -93° 26.594'	4.35'	Concrete	Asphalt/Gravel—25 Trailers
Bossier Public Ramp	N 32° 22.399' W -93° 25.977'	Accessible in drawdown	Concrete	Gravel-20 trailers

RV Park	N 32° 19.8923’ W -93° 26.2495’	2.97’	Concrete	Gravel—10 Trailers
Grice’s Launch Pay to Launch—$3.00	N 32° 19.364’ W -93° 24.912’	Accessible in Drawdown	Concrete	Gravel—30 Trailers
Bienville Public Boat Ramp	N 32° 22.622’ W -93° 23.838’	2.97’	Concrete	Asphalt—20 Trailers
Port O Bistineau Pay to Launch--$5.00	N 32° 27.721’ W -93° 20.947’	Accessible in Drawdown	Concrete	Gravel—20 Trailers
Camp Bis-T-No Pay to Launch—$3.00	N 32° 25.007’ W -93° 25.677’	5.38’	Concrete	Asphalt—5 Trailers

Boat Docks

Public boat docks are located at all public ramps to enable boaters to temporarily moor boats while parking automobiles.

Piers

The Lake Bistineau State Park has a fishing pier available at Area 2. The fishing pier adjacent to the boat launch at Area 1 was damaged during the 2016 flood and has been dismantled. A new pier is included in future renovation plans at the park.

There is a handicap accessible public fishing pier available at the west side of the Lake Bistineau Dam, where a portion of the old Hwy 154 Bridge was converted to a fishing pier. This pier is currently in need of repair; therefore, it is closed to the public until further notice.

State/Federal Facilities

Lake Bistineau State Park
103 State Park Road, Doyline, LA 71023
318-745-3503 or 888-677-2478 toll free

Lake Bistineau State Park-- (South of I-20 at Minden and 9 miles south of Doyline on LA 163) --This park features 13 cabins, 67 improved campsites, a lodge, 2 group camps with pool, 2 boat launches, fishing piers, hiking trails, playgrounds, and a lakefront.

For reservations, call 1-877-CAMP-N-LA (877-226-7652) toll free.

Email: lakebistineau@crt.state.la.us

Website: http://www.crt.state.la.us/parks/ibistino.aspx

SHORELINE DEVELOPMENT

The majority of the Lake Bistineau shoreline is well developed from the dam northward to Crane Lake. Most of the homes constructed lakeside range from mobile homes & fishing camps to moderately sized residences. A smaller percentage are larger residences and include several multi-million dollar estates scattered around the lake. Many of the lakeside homeowners have added piers and boat houses. Canal systems have been established in many areas of the lake increasing the effective length of the shoreline and providing greater opportunities for shoreline development. Similar canals have also been constructed along some of the shorelines in shallow water areas, providing lake access for shoreline property owners. Most of the shoreline development is not governed by neighborhood homeowner covenants. Many seldom used or abandoned fishing camps and travel trailers are located along the shoreline. A few modern subdivisions exist on the lake and appear to have building restrictions; however, in the most desirable areas, it is not uncommon to have a new upscale residence in close vicinity to much older fishing camps. Most areas were developed many years ago. Restaurants, bars, and pay launch facilities have their niche in the attraction of Lake Bistineau. These facilities range from old fishing camps with small cabins and travel trailers to larger full service marinas with on-water refueling, house boat mooring docks, sewage dump stations, and modern restaurants. The Lake Bistineau State Park on the west shore of the lake near Clark's Bayou was established in 1946 and offers many public use facilities. Historically, Lake Bistineau drew fishing, ski, jet-ski, party barge, and house boat traffic which provided significant business for these facilities. Recreational boating has been on the decline on Lake Bistineau for a number of years. The decline can be attributed to improvements on other waterways in closer proximity to urban areas such as the Red River, along with the ever present threat of salvinia on the lake during the warmer months. The current recreational users of the lake are primarily fishermen and hunters.

Most of the shoreline that is suitable for development has already been developed to varying degrees. There are several areas where the water is too shallow for development without construction of a canal system that has not been developed, and a couple of stretches of shoreline that would make ideal home sites or marina locations that the landowners have opted not to develop.

PHYSICAL DESCRIPTION OF LAKE

Shoreline Length
91.5 Miles

Timber Type

Lake Bistineau is heavily forested with dense stands of cypress trees covering roughly half of the 17,200 surface acres of the lake (Figure 1). There are a few areas with large expanses of open water over 250 acres, these include Crane Lake, New Orleans Pond, Greg Lake and Catfish Pond. The other open water areas are generally much smaller slough channels through the cypress forest or the main channel of Dorcheat. The remainder of the lake has scattered cypress trees and stumps throughout. There are a few tupelo trees in the upper reaches of some of the small tributaries; these comprise less than 1% of the aquatic forest throughout the lake.

Figure 1. Aerial view showing cypress timber in Lake Bistineau.

Average Depth

9 Feet

Maximum Depth

25 Feet

Total Water Volume at Pool Stage

115,000 Acre Feet or 36,006,572,500 Gallons

(Note: this data based upon estimations by NOAA Hydrologists in April 2015)

Natural Seasonal Water Fluctuation

Normal water level fluctuation is 1-2 feet during the course of the year. Water levels more than a few inches below pool stage are not common when the lake is not undergoing a drawdown, as the lake has a large watershed. In some years, fluctuations of 3-4 feet may be experienced with even greater water elevations reached after heavy rains. Following record heavy rains March 8-9, 2016, the Lake Bistineau water level reached a record elevation of 150.16' MSL on March 13, 2016.

EVENTS/ PROBLEMS

The Natural Lake

In the early 1800's, boat traffic began to increase on the Red River with Bayou Dorcheat and Lake Bistineau providing an avenue for steamboat traffic into northwest Louisiana. During the 1830's, efforts were made to improve navigation on Lake Bistineau, and several landings and communities were thriving around the lake. Steamboat traffic was commonplace and a very important part of the economy of the region. The present day names for many areas of the lake were derived from these early developments.

Efforts to remove the Great Raft which formed Lake Bistineau were begun in 1833 by Captain Henry Miller Shreve. A channel through the raft had been created by the efforts of Shreve and his men, but less than three months later the raft was reforming. In 1841 additional progress was made, but the raft had reformed 20 years later by the beginning of the Civil War. It was not until 1873, when dynamite was available, that the raft was finally cleared. Once the obstructions were removed, the water level in Lake Bistineau began to slowly drop and steamboat traffic diminished. Following the removal of the Great Raft, the lake was navigable to steamboats only during the high water periods from late winter through spring. In 1892, the final journey by steamboat was made up the lake to the Noles' landing area.

During 1850, commercial salt production began on Lake Bistineau at a salt spring located on the north end of Lake Bistineau known as the Bistineau Salt Works. The process involved evaporation of the brine water leaving salt behind, much as the Caddo Indians had done in earlier years. Large scale salt production ceased following the end of the Civil War.

In 1868, the "Lake Bistineau Navigation Project" was initiated. This was a $40,000 project to remove trees and debris in order to improve navigation on the lake.

Organic Detritus

A series of mid-summer drawdowns were conducted during 2004 and 2005 to aid in reduction of the large amount of organic matter on the lake bed (Figure 2). Historically, Lake Bistineau has had heavy infestations of water hyacinth, alligator weed, and submersed native aquatic vegetation. The decay of these plants, along with leaf litter from the cypress canopy, has accumulated a large layer of organic matter on the lake bed. This problem is especially evident in the upper end of the lake and in cove areas. This deterioration of the aquatic habitat has resulted in the loss of spawning substrate for nesting sport fish species. A decline in the relative abundance of sport fisheries was observed during electrofishing sampling in the years preceding the lake drawdowns. The lake bottom condition was most impacted in the north end of the lake, with fish species composition changing from desirable sport fishes to less desirable species that thrive in shallow, weedy habitats. Examples include spotted gar, lake chubsuckers, and spotted suckers.

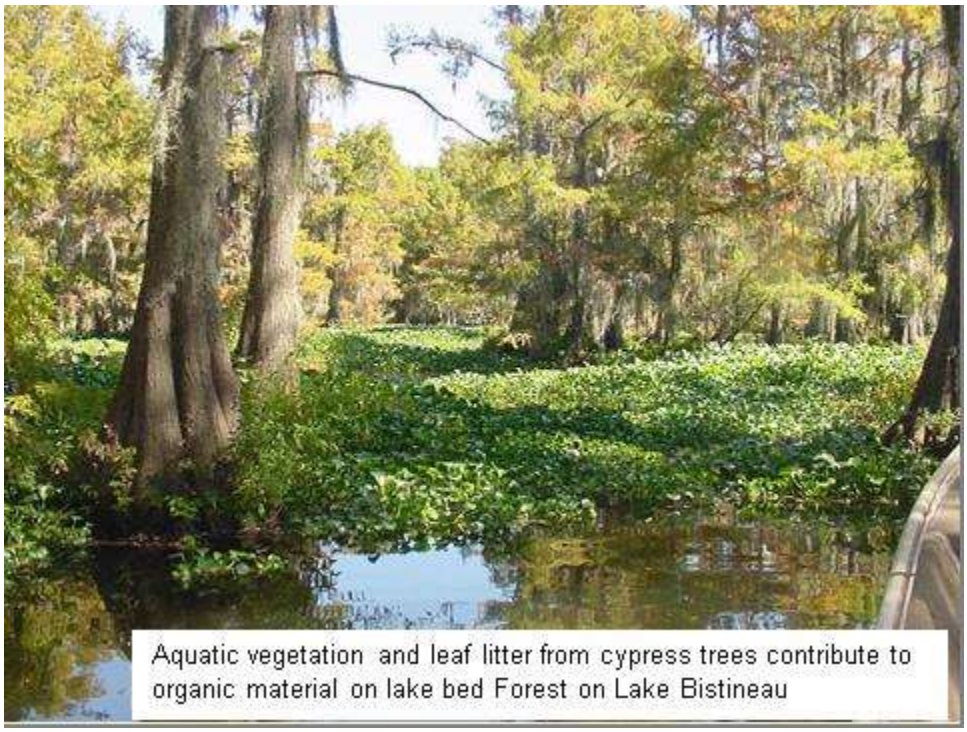


Figure 2. Aquatic vegetation and cypress trees contribute to organic accretion in Lake Bistineau.

Previous drawdowns had demonstrated that a fall-winter drawdown in a typical year does not provide sufficient drying action to allow for substantial aerobic decomposition of organic material (Figure 3). In order to provide for effective drying of the lake bed, a July 15 start date was selected for the drawdowns. The lake was dewatered to the maximum extent possible (seven feet) with the current drawdown structure. The drawdown continued through the end of January when the gates were closed and the lake allowed refilling.

Figure 3. Lake Bistineau while undergoing a drawdown to dry out and oxidize organic matter to improve bottom firmness.

Department recommendations for the drawdowns were received favorably by the majority of the public and were supported by the police juries from each of the three parishes in which Lake Bistineau lies. However, they were opposed by the Lake Bistineau Preservation Society. Legal action, including an injunction against the planned drawdown, was sought by the group. A favorable ruling for the department allowed the drawdown to proceed as planned. A similar suit was filed against the department and several key employees prior to the 2005 drawdown. This suit alleged that the department was polluting the lake with herbicide applications for aquatic vegetation control and also sought to have the drawdown stopped. The courts once again ruled in favor of the department. The drawdown was allowed to proceed.

The original plan called for a series of three consecutive drawdowns for reduction of the organic material. The drought conditions experienced during the summers of 2004 and 2005 provided excellent conditions for drying, and the results obtained in two years exceeded expectations. The drawdown scheduled for 2006 was determined to be unnecessary and was not conducted.

Significant improvements were made to the fisheries habitat of Lake Bistineau as a result of the two consecutive mid-summer through winter drawdowns during 2004 and 2005. Substantial reduction in the depth of organic material on the lake bed was noted in many areas that were exposed. Improvements to spawning substrate were also significant, with sand being exposed following the decomposition of the organic material. Sunfish responded well to the improved spawning habitat and anglers quickly took notice. Fishing activity on the lake increased from previous years. The drawdowns were also beneficial to the black bass population.

Two methods were utilized to quantify the reduction in organic material. One method involved the use of an improvised device termed the "muckometer" (Figure 4). This device was used to differentiate between the soft and hard bottoms of the lake while the lake was at normal levels. A 12" diameter perforated aluminum disk was mounted on a length of pipe which served as a sleeve for a ½" metal rod which slid down to identify the hard bottom. This device was placed vertically in the water until the perforated disk contacted the soft bottom of the lake. The weight of the apparatus defined the depth of the soft bottom. A set screw was then loosened allow the ½ metal rod to slide freely within the sleeve. A pressure scale was then used to apply 10 lbs. of pressure to the top of the metal rod to force the rod through the soft organic material on the lake bed and stop at the hard bottom of the lake. The set screw was then tightened and physical measurement made of the length the rod was protruding past the disk. This roughly equates to the depth of the organic material at the sample site. Three measurements were made at each station.

Figure 4. Measuring the depths of bottom organic muds in Lake Bistineau.

The other method consisted of placing ¾" PVC stakes in the lake bed during the initial dewatering process of the 2004 drawdown (Figure 5). Stakes were pushed into the lake bed and then hammered in further to the point of refusal of further penetration. The stakes were allowed to protrude 1.5" above the bottom substrate (Figure 6). After significant drying action occurred during the 2004 drawdown and in subsequent drawdowns, measurements of the height the stakes protruded above the bottom substrate were made (Figure7). The difference in the height the stakes protrude above the lake bed roughly equates to the reduction in organic material on the lake bed at the site. Both methods indicate a significant reduction in organic material following the drawdowns.

Figure 5. Inserting PVC stakes into the lake bottom.

Figure 6. Establishing a baseline for the existing mud level in Lake Bistineau.

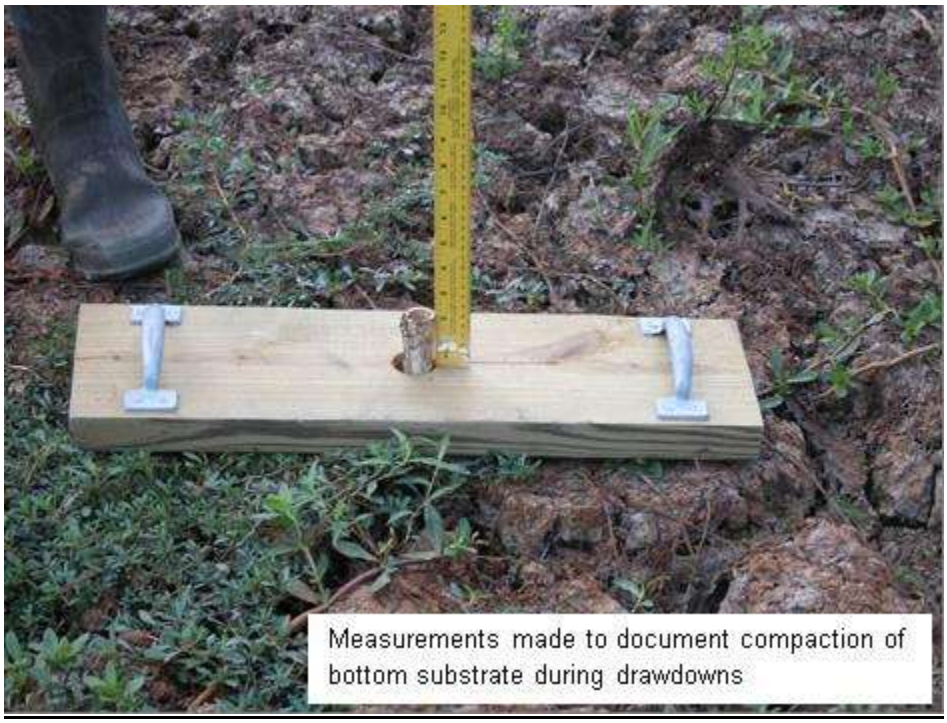


Figure 7. Measuring the compaction levels in Lake Bistineau.

Channel Marking

New channel markers were installed in 1993 by the Department of Transportation and Development with assistance from the Louisiana Department of Wildlife and Fisheries. In most areas of the lake, the signs marking the channel were attached directly to the cypress trees (Figure 8). In areas that lacked sufficient cypress trees, the metal signs were placed on pilings adjacent to the Bayou Dorcheat channel. Many of these metal signs have been compromised by the effects of wind and have fallen into the lake. There currently is a need to remark the main channel of the lake, replace signs that are missing, and trim cypress limbs that obscure signs attached to trees.

Figure 8. Channel markers fastened to cypress trees along the Bayou Dorcheat channel in Lake Bistineau.

Future channel marking projects could include marking of other areas of the lake rather than just the main channel. Many boat lanes throughout the lake have been marked by local residents with makeshift materials. Marking these areas in a uniform fashion would be a valuable improvement to the lake.

Lake Bottom and Shoreline Property Ownership

There have been issues concerning property ownership in and around Lake Bistineau for many years. The first known land dispute began in 1896 when a tract of land adjacent to the Hay Meadows was purchased. The owner, believing he had ownership of the lake bed in front of his property, proceeded to keep others off the lake bed in that area. In 1899, the Supreme Court of Louisiana ruled that no one can exclude others from the lake bed or take possession of it.

In 1944, the Louisiana Supreme Court held in a unanimous opinion in the case of Evans vs. Dugan, that: *riparian proprietors of the shores of Lake Bistineau have no private property right in the use of the Lake Preserve. And, the plaintiff as a riparian property owner has no right to appropriate to his exclusive use, the shore of Lake Bistineau lying in front of his land, nor has he any private property right in the use thereof, which is public and under the administration and control of the state agencies designated in the legislative acts.*

One of the provisions of Act 64 of 1942 is that: *No building to be used as living quarters shall be allowed on the preserve and no obstructions of any kind shall be built thereon unless the same are in keeping with the purpose of the preserve.* `

Lands lying below the mean high water mark of 1812 or the "meander line" (148.6' NGVD) are included in the Lake Bistineau State Game and Fish Preserve and should be public property. However, there are many instances of homes along the shoreline of the lake that are below this elevation and likely are located on property within the game and fish preserve. There are also instances of homes which appear to be above this elevation which the owner does not have clear title. This is likely due to the survey conducted in 1812 being a very rough survey, as is indicated on maps from the State Land Office, where the meander line is depicted as a straight line in several areas without regard for elevation or terrain between the survey points. According to information provided to Inland Fisheries from the Section Manager, Land and Water Bottom Management, with the State Lands Office; "the contour line is the exact line for determining state lands. The survey lines are estimations of state property."

There are numerous instances where people have illegally occupied the state property of Lake Bistineau. Travel trailers and mobile homes have been moved onto areas along the shores of the lake as residences. In one such situation, tents were pitched on Peggy's Island and a houseboat anchored nearby. These inhabitants were evicted from the area. Unfortunately, many of these matters have not been resolved. The school board section in Bienville Parish has quite a number of camps and residences located on the shoreline and interior lands of this property owned by the Bienville Parish School Board, including several that are obviously located below the meander line and therefore within the boundaries of the Lake Bistineau Game and Fish Preserve.

Ownership of the lake bed and the actual rights of the property owners have been difficult to discern. Information from the State Land Office is, or appears to be, contradictory as to whether individuals retain ownership and property rights on the lake bed. Maps produced by the State Land Office indicate roughly half of the lake bed to be in private ownership and the other half to be state owned lands. Information from John P. Evans, Jr., Section Manager, Titles, Surveys, GIS, with the State Land Office as relayed to Monica L. Grappe, Right of Way and Land Acquisition Consultant with Bossier Parish, indicates that the lake bed and bottoms for Lake Bistineau are owned by the State under the Equal Footing Doctrine. The "equal footing" doctrine has had an important effect on the property rights of new States to soil under navigable waters. The doctrine states that States have reserved to themselves the ownership of the shores of navigable waters and the soils under them. The principle of this case supplies the rule of decision in many property-claims cases. Lake Bistineau was navigable water at the time of statehood, as indicated on a land grant map of 1838.

To further complicate issues of land ownership on Lake Bistineau, the United States filed suit against the State over mineral rights on an 80.6-acre tract of the lake bed in 2004. The case was Devon Energy Production Co. LP v. Norton et al., case number 5:04-cv-02093-RGJ-MLH, in the U.S. District Court for the Western District of Louisiana.. In a related letter of June, 2005 from Donald W. Washington, United States Attorney, Western District of Louisiana, to Governor Kathleen B. Blanco, Mr. Washington states: "The Departments of Interior and Justice contend that the United States owns the bed of Lake Bistineau down to the stream-bed of Loggy Bayou / Bayou Dorcheat because Lake Bistineau was not navigable in its natural and ordinary condition, but was only temporarily so because the Great Raft impeded the drainage of these bayous into the Red River. Moreover, even if Lake Bistineau were navigable at statehood, the United States acquired the lands exposed by the reliction of Lake Bistineau that resulted from the clearing of the Raft. As the upland owner, the United States acquired title down to the ordinary high water mark of the stream when Lake Bistineau drained due to the removal of the Great Raft on the Red River under the federal common law doctrine of reliction. Further still, the United States submits that it continues to hold title to all lands above the stream bed, notwithstanding the refilling of the lake, as the doctrine of submergence prevents the divestiture of the ownership by the United States because a State cannot condemn federal land." The case was dropped in 2009; therefore, leaving ownership with the State of Louisiana.

Lake Access During Drawdowns

Drawdowns for habitat improvement and aquatic vegetation control prevent boating access from many public and private launches and also for many shoreline property owners. The table of boat ramps in the "Access" section indicates boat ramps that are useable under drawdown conditions. While these necessary drawdowns are an inconvenience for shoreline property owners and negatively impact some boat launch facilities on the lake, other private launch facilities have ramps that extend deep enough into the water during a drawdown. These facilities see an increase in business during periods of drawdown.

Several areas of Lake Bistineau dried out sufficiently during the drawdowns in 2004 and 2005 to allow for travel of all-terrain vehicles (ATV's) on the lake bed (Figure 9). Although some questions remain concerning legality of foot and vehicle traffic on the lake bed during drawdowns, ATV riding has become a very popular recreational activity during drawdowns. One launch facility on the northern end of the lake serves as an access point for many recreational ATV riders. The facility realizes increased revenues during these periods by charging an access fee.

Figure 9. Lake Bistineau during drawdown with vehicle and ATV use by the public.

Head Cutting – Erosion Problems in Outflow Channel

Following the 2005 drawdown, DOTD engineers informed the department that no further drawdowns could be conducted until necessary structural repairs were made in the outflow canal. Erosion had progressed to the point where the Bistineau Dam structure was in imminent danger of being compromised. A temporary emergency repair to the head cutting problem was made prior to the July 15, 2008 start of a drawdown for control of giant salvinia. The erosion had been evident for many years as water flowing out of the lake continued to erode a path back towards Loggy Bayou. The channel ultimately drained Stumpy Lake. The head cutting problem was first observed in the 1970's. By the mid 1980's, an initiative was underway to correct the problem. Unfortunately, funding was not available. Stumpy Lake drained, and considerable damage was observed on Loggy Bayou WMA as the erosion problem continued. The temporary fix consisted of grouted riprap placed in a strategic location in the outflow channel adjacent to the Bistineau dam. Further repairs to the outflow channel were made prior to the start of the 2009 drawdown for salvinia control as additional rip rap was installed and grouted in place. By 2017, significant portions of the grouted riprap were damaged, and there were signs of further erosion in the area. DOTD engineers developed a project to make repairs to the area and restore much of what was installed in 2008. Due to contractual delays, the 2017 drawdown needed to be extended from the original November 30 closing date until January 26, 2018 so that the outflow area could remain as dry as possible to perform the repair work. Erosion problems will continue to exist and will need frequent repairs unless a more permanent solution is installed. The preferred corrective action entails installation of sheet pilings and rock for construction of a weir somewhere downstream of the spillway. The weir would restore Stumpy Lake and slow water current velocity near the dam. LDWF and DOTD began discussions again in January 2018 to develop a conceptual project to address the situation under current conditions. Funding for any such project is likely to be a limiting factor.

Boating Access- During Drawdowns and Limited by Giant Salvinia

Historically, Lake Bistineau was home to as many as 50 commercial "fish camps" or boat launches scattered around the lake. Soon after impoundment, these small businesses sprang up around the lake, and derived most of their revenue from either renting boats or boat storage. This practice has nearly disappeared on Lake Bistineau, as well as other area lakes, as the habits of anglers have changed over time. The rental business has diminished over time. Also, with the advent of larger, faster boats; boaters are able to travel greater distances over the water. Therefore, there is no longer a need for as many access points around a lake. Over time, many of these establishments went out of business if they were unable to adapt. Presently, there are approximately nine private marinas that remain in business around the lake, in addition to the five public launches operated by the parishes or the state park.

When Lake Bistineau is fully drawn down, there is still approximately 10,000 acres of water remaining that can be accessed from four boat launches open to the public. There is a need to have more access points around the lake, as it is not easy to quickly navigate the entire lake during drawdown periods. LDWF partnered with Webster Parish to lease the Port O'Bistineau property and improve the location to provide additional parking and improved deep-water access during drawdowns. The project was completed late in 2016 and included a new mooring pier, bathroom improvements, parking lot, and extended the boat launch to improve access during low water conditions.

The LDWF has also partnered with Bossier Parish to make improvements to the launching facility at the Bossier Parish Public Launch on Catfish Pond. LDWF provided funding to assist with dredging of the ramp area to make a deep-water access point in 2011. In 2016, LDWF provided and installed oil-spill containment boom to protect the launch from the large mats of salvinia that can be present in the area. The Parish paid for the installation of pilings to anchor the boom in place. The boom is fashioned in a serpentine pattern to allow boats to navigate through the opening, but to minimize the amount of salvinia that can be blown through the boom to reach the launch. The LDWF installed and has maintained a similar boom at the state park since 2014. The area behind the boom is treated frequently with herbicides to provide a mostly "salvinia-free" launching experience for boaters.

2016 Drawdown Delay

With regards to precipitation, 2016 was an unusual year on Lake Bistineau. Following the successful 2015 drawdown, less than 500 acres of salvinia were present despite a mild winter. By late February, the plants were beginning to show signs of active growth and contract applications began. Beginning on the evening of March 8, 2016, approximately 18-24 inches of rain fell within the watershed of Lake Bistineau over a 48-hour period. The runoff from this event led to record level flooding on Lake Bistineau as the waters rose to 9 feet above pool stage by March 14, 2016.

The spring and summer of 2016 were unusually wet due to an *El Niño* weather pattern. Water continually flowed over the Lake Bistineau spillway from December 15, 2015 until July 12, 2016. This historic flood event flushed much of the salvinia over the spillway, and stranded tremendous amounts of salvinia on the shoreline as waters receded. It was estimated that only 70 acres of matted salvinia remained during an April 7 survey. By early summer the lower portion of the lake (below Bossier Slough) remained mostly open. However, as temperatures increased in July, the plants expanded rapidly. Based upon an experiment conducted on the lake, it was estimated that salvinia was growing at a rate of doubling every 2-6 days. By July 13, salvinia covered approximately 1,743 acres of Lake Bistineau despite the on-going herbicide efforts that treated in excess of 1,700 acres. The open-water sections of the lake such as Gregg Lake, Catfish Pond and New Orleans Pond were uncharacteristically clean and void of any matted salvinia. Conversely, the heavily forested areas of the lake, including areas on the southern portions, contained thin mats of salvinia by this time; much of it could be successfully stranded with the implementation of a drawdown. Salvinia mats were also forming on the fringes of these open water areas that would soon "infest" these areas and impair boating access within weeks due to the accelerated growth rate accompanying summer temperatures.

Per the Lake Bistineau Waterbody Management Plan, a drawdown was scheduled to begin on July 25. Shortly after the LDWF news release, a group of homeowners around the lake began to express interest in delaying the drawdown to allow a few more weekends of watersports recreation on the open portions of the lake. This group contacted local elected officials. The LDWF Region 1 office only received five emails requesting a delay in the opening. People in-favor of a drawdown began to contact LDWF and elected officials as well. Contrarily, the LDWF Region 1 office received in excess of 50 phone calls and emails in favor of continuing with the planned drawdown. A conference call meeting was conducted between the local legislative delegation and the Secretary of LDWF on July 22 and it was decided to delay the drawdown 3 weeks until August 15, 2016.

During the 3-week period the drawdown was delayed, giant salvinia expanded to cover 5,852 acres of Lake Bistineau. Dense mats were formed in the forested areas of the lake, and all boating access was blocked near the Port O'Bistineau. The Port is a popular location with anglers as soon as a drawdown begins. However, it was approximately three weeks after the drawdown began before control efforts could thin the mat enough to allow for boating access at that location.

During this same time period, LDWF employees were performing counts of boat trailers at access points around the lake to aid in statistical design of a creel survey. LDWF also tracked the number of boats encountered while on the water during much of the summer. As salvinia began to expand in June, boating use of the lake began to decline. During the three weeks the drawdown was delayed, an average of only seven boats was observed accessing the lake per

day until the drawdown started. This time period marked the lowest boating use all year and represented a 95 % drop-off from the peak use that occurred in February and early March. Soon after the drawdown was initiated, use of the lake began to increase sharply.

Beginning in May 2016, LDWF began to hold monthly public meetings to communicate information about Lake Bistineau. After the drawdown delay and the rapid expansion of salvinia, public outcry at these meetings was strongly in support of not delaying future drawdowns, with many people questioning why the decision was made.

Upon completion of the drawdown, an estimated 1,807 acres of salvinia remained as of November 29, 2016. This was the largest amount of salvinia that had been present on the lake going into the winter since the record year of 2009. In the two years' prior, salvinia had been kept to less than 2,000 acres on the lake throughout the year; thus allowing recreational use of the lake year-round. The winter of 2016-2017 was again mild with minimal frost or freeze damage to the salvinia. During the drawdown period, LDWF treated over 4,000 acres of giant salvinia using both boats and aerial applications. At the conclusion of 2016, the effects of the delayed drawdown were not yet fully known as the increased amount of salvinia on the lake negatively impacted the users of Lake Bistineau well into 2017 and perhaps beyond.

The costs of the delay can be difficult to quantify and may not be fully known for a period of time. Statistical analysis of LDWF data from 2008-2015 indicates a 91% correlation between the number of acres present when a drawdown begins and the number of acres present at the beginning of the following year, regardless of increased herbicide efforts. For the period 2014-2016, giant salvinia coverage on Lake Bistineau averaged 60 acres at the beginning of each spring. However, in the spring of 2017, 1,414 acres of salvinia were present when the plants began to grow. The extra growth that occurred during the drawdown delay, combined with a mild winter, allowed much more salvinia to be present despite increased herbicide efforts.

LDWF herbicide spray crews treated 6,060 acres from February 22 - May 1, 2017 in an effort to slow the plant growth. During that same time, salvinia expanded to cover 3,742 acres which prompted an early drawdown beginning May 1. The lake remained drawn down until late January of 2018, during which time LDWF treated a total of 15,024 acres at a cost in excess of $1,409,568. An estimated 438 acres of salvinia remained on the lake at the conclusion of the drawdown, which returned salvinia coverage to levels seen in previous years. Additionally, two hard freeze events occurred in early January 2018 which appear to have severely damaged the remaining salvinia. During the 2016 drawdown period, LDWF treated 4,006 acres and spent $321,217.34 directly on herbicide applications. The dollar amount spent on herbicide applications in 2017 was the highest of any year on record. Due to the delayed drawdown of 2016, LDWF was forced to spend considerable more funds on Lake Bistineau in 2017, along with a much longer drawdown period to achieve the same results obtained in previous years. From 2008-2015, LDWF treated 2,455 acres on average during drawdown periods which

contributed to an average starting acreage of 382 acres the following spring. Due to many factors, it is difficult to make worthwhile comparisons for expenditures prior to 2014. Table 2 below shows the relative expenditures and successes of the herbicide program for 2014-2015 compared to 2016-2017. Essentially, LDWF expenditures for 2016 equaled that of the two previous years combined; however, significantly more salvinia remained on Lake Bistineau than in previous years. Consequently, additional large scale herbicide treatments and an early drawdown were needed to combat the problem in 2017. LDWF spent in excess of $1.4 million on herbicide applications for Lake Bistineau alone in 2017, by far the highest expenditure year on record.

Table 2. LDWF expenditures and acres treated during drawdown periods for 2014-2018.

Year	Acres Sprayed During Drawdown	Expenditures During Drawdown	Winter Acreage Estimate
2014	2,366	$174,137.32	800
2015	1,713	$156,342.58	500
2016	4,006	$321,217.34	1807
2017	8,964	$828,874.88	656
2018	1,091	$106,943.50	108

MANAGEMENT ISSUES

AQUATIC VEGETATION

Lake Bistineau has had problems with excessive aquatic vegetation since shortly after impoundment. However, prior to impoundment, normal seasonal water level fluctuation was reported to have kept the lake clear of overabundant aquatic vegetation. One of the primary means of dealing with aquatic vegetation problems has been through the use of drawdowns. Lake Bistineau drawdowns have been conducted with varying degrees of success and often with much controversy.

The initial impoundment of Lake Bistineau in 1938 created large expanses of shallow water with depths of less than four feet. According to the Proposed Management and Research Plan

for Lake Bistineau written by LDWF biologists in 1955, these areas were soon dominated by native vegetation including coontail, pondweed, southern naiad, duckweed, American lotus, water lilies, fanwort and bladderwort. A letter dated July 7, 1945 from James Nelson Gowanloch, Chief Biologist with the Minerals Division of the Department of Conservation, indicated that American lotus was a major problem on Bistineau and primrose was quite prevalent.

The first drawdown of the lake was reported to have been conducted in 1945 for the purpose of aquatic vegetation control. The lake was dewatered again for the construction necessary to raise the pool level by 4 feet in 1951. By 1965, it was reported that the "lake had become nearly impassable due to moss and hyacinths."

In 1966, the Lake Commission initiated a series of five consecutive 5-foot post labor day drawdowns for control of water hyacinths and other aquatic vegetation in the lake. In 1969, the Lake Commission was abolished by legislative action. Its powers and duties were transferred to the Louisiana Wildlife and Fisheries Commission, which continued with the planned drawdowns. On September 1, 1970 a restraining order was issued to stop the scheduled drawdown. Several camp owners had complained that the previous drawdowns harmed the lake and their businesses. This order was not upheld and the drawdown was allowed to be conducted. As the vegetation problems persisted, the sixth consecutive drawdown began after Labor Day in 1971.

A post Labor Day drawdown for vegetation control was conducted in 1975, despite vandalism to the gates in an attempt to keep the lake from being lowered.

Correspondence dated August 11, 1980 indicates no major aquatic weed problems present when biomass sampling was completed on July 8, but there was some increase in biomass of submerged vegetation from the previous year.

Following a mild winter in 1982, water hyacinth coverage increased tremendously. The one spray crew assigned to the lake could not keep pace with the growth. Crews from throughout the State were temporarily assigned to work on a 2-week rotational basis beginning April 4, 1983. A total of 5,030 acres of water hyacinths were treated during the period April 4 through August 12, 1983, at a cost of $98,680. Despite these efforts, aerial and boat surveys conducted in August 1983 revealed an estimated 30% (5,160 acres) of the lake's surface to be completely matted with water hyacinth, and an additional 10,320 acres (60%) to be moderately infested. A post Labor Day drawdown in 1983, followed by record cold temperatures in January of 1984, afforded excellent control of the water hyacinths.

Hydrilla was first noted in Lake Bistineau during the summer of 1995, when one small cluster of plants was discovered. Surveys conducted during July and August 1996 revealed a more advanced coverage, including a dense fringe of hydrilla along the shoreline on the lower end

of the lake. A post Labor Day drawdown was conducted in an effort to control hydrilla. The lake never dewatered significantly due to heavy rains that kept the lake several feet above pool stage throughout much of the drawdown period. Significant control of hydrilla was subsequently observed, likely due to the high and turbid water of the following spring.

During the summer of 2000, alligator weed and water hyacinth covered most of the upper end of the lake and was problematic in other areas. Many of the shallow water areas had extensive coverage of submersed aquatic vegetation. An increase in hydrilla coverage had been observed in the previous few years. A fall / winter drawdown was conducted during 2000 for the purpose of aquatic vegetation control and reduction in organic material. Some positive results were obtained by allowing the vegetation to dry and desiccate, but heavy rains began in November and the lake refilled prior to the record cold temperatures in January.

Prior to the 2004 drawdown, Lake Bistineau had extensive coverage of water hyacinth, alligator weed and primrose. The upper end of the lake was almost completely covered. Many shallow areas throughout the lake also had very extensive coverage of submersed aquatic vegetation. Hydrilla had increased in coverage, although not yet to problematic levels. Many areas of the lake had become nearly impassable to boat traffic due to the aquatic vegetation and build-up of organic matter on the lake bed.

Following the 2004 mid-summer to winter drawdown, much of the submerged vegetation and water hyacinths were significantly reduced. However, alligator weed and water primrose remained problematic in some areas. A drawdown conducted from July 15, 2005 through the end of January 2006 provided control for a short time. By June of 2006, areal coverage of alligator weed and water primrose was in excess of 2,000 acres. By late summer, coverage began to decline with increased herbicide treatments and alligator weed flea beetle feeding activity.

Giant salvinia was discovered in March of 2006. Primary stage plants were found widely scattered over the lower 1/3 of the lake. Early efforts were aimed at total eradication of the plant through herbicides and physical removal. Additional LDWF spray crews were brought in to assist with the efforts. It soon became evident that the plant was too widespread for eradication to be a possibility.

Giant salvinia is a free floating aquatic fern native to Brazil. This invasive species has the potential to double in biomass every 3-5 days. In Lake Bistineau, coverage expands at a tremendous rate, doubling every week to 10 days during the prime growing season. A single plant is estimated to expand to cover two-thirds of an acre during a single growing season. Lake Bistineau has demonstrated to be ideal habitat for giant salvinia and other floating aquatic vegetation. Many areas of the lake are heavily forested and provide sheltered areas for floating plants to become lodged and expand coverage. Unlike many other lakes, prevailing winds

provide little wave action to help control floating plants. In addition to the trees, many areas have bluff banks that help reduce wind action on the narrow, meandering lake. Essentially, Lake Bistineau is a nutrient-rich, deep-water swamp habitat. Foliar herbicide applications are difficult in many of these forested areas.

Figure 10. Looking east along the dam of Lake Bistineau at the mat of giant salvinia.

Since 2007, vegetation control efforts on Lake Bistineau have been primarily directed to giant salvinia. Efforts have included extensive foliar herbicide applications utilizing boats, UTV's, backpacks, and helicopters. Several new formulations and products have been tested in cooperative efforts between industry leaders and LDWF. In-water herbicide treatments have been tested in isolated nursery areas and large expanses of the lake with varying degrees of success. Physical removal methods have been tested. Other experiments include salinity tests, grass carp trials, desiccation trials, temperature exposure tests as well as cooperative research efforts with local universities.

Through these efforts, it has become clear that foliar herbicides alone cannot effectively control the rapid expansion of giant salvinia during warm weather on Lake Bistineau. Numerous "spray pushes" have been conducted using 4-6 LDWF crews simultaneously with contracted spray crews. In 2009, 18 LDWF spray crews were brought in for two weeks in April and May in an effort to control salvinia. Through this effort it became apparent these pushes are able to slow the expansion of the plants, but not reduce the total coverage once the plant densities reach a certain point. With the exponential growth of the plant, the effort required to simply keep up with the new growth becomes unreasonable. It is estimated that it would take in excess

of 50 crews working 5 days per week to control salvinia with herbicides alone. This amount of effort is simply not economically feasible and could not be maintained.

Foliar herbicide applications are recognized as a legitimate component of a program that includes all available tools for control. An integrated management program that includes physical, chemical, and biological measures has improved control of giant salvinia. LDWF technical staff will remain receptive to consideration of any additional tools to add to the integrated management program. Critical evaluation of existing and proposed control measures will continue as part of an effort to combat this exceptionally prolific invasive species.

To date, drawdowns have been the only successful control measure capable of reducing the overall coverage of giant salvinia during the peak growing season on Lake Bistineau (Table 3). The only significant reductions in giant salvinia since 2006 have resulted from either a drawdown or a freeze event (Table 4 & Figure 11). Drawdowns strand the plants on the shore, where dry summer conditions allow for rapid desiccation of the plants. During drawdown periods, considerably more shoreline is exposed to wind and wave action stranding salvinia on the shore. Lake Bistineau is still 10,000 acres when fully drawn down. This large amount of remaining water is beneficial for providing refuge for fishes during low water conditions and ensures enough water remains to sustain a healthy fishery.

Table 3. Annual spring giant salvinia estimates and acres treated on Lake Bistineau for 2006 – 2018.

YEAR	Spring Estimate	Treated Salvinia Acres	Max Estimate	Drawdown
2006	< 2	554	200	No
2007	200	4,039	4500*	No*
2008	2208 (April)	6,877	4500	Yes
2009	850(March)	5,995	7386	Yes
2010	1 (April)	1,837	500**	No**
2011	20(January)	3,408	600**	No**
2012	50(January)	7,057	2674	Yes
2013	880 (March)	7,389	3899	Yes
2014	56 (March)	4,139	1725	Yes
2015	55 (March)	3,490	1781	Yes
2016	70 (April)	4,990	5852***	Yes***
2017	3,349 (March)	15,024	3742	Yes
2018	1 (April)	2,619	1491	Yes

* - Unable to conduct drawdowns due to erosion concerns below spillway pending repairs.

** - Lake under drawdown conditions all year. Did not return to pool until Jan. 2012 due to drought.

***-Drawdown delayed beyond LDWF Management Plan recommendations.

Table 4. Increase in acres of salvinia and acres treated pre-drawdown, 2008-2009, 2012-2018.

YEAR	Spring Estimate	Pre-Drawdown Treated Salvinia Acres	Max Estimate	Acres Increase
2008	2,200	6,063	4,500	2,300
2009	850	5,995	7,386	6,536
2012	50	4,896	2,674	2,624
2013	880	4,123	3,899	3,019
2014	56	2,173	1,725	1,669
2015	55	1,427	1,781	1,726
2016*	70	1,714	5,582	5,512
2017	1,414 (Feb)	6,060	3,742	2,328
2018	1	1,528	1,491	1,490

*Drawdown delayed beyond LDWF Management Plan recommendations.

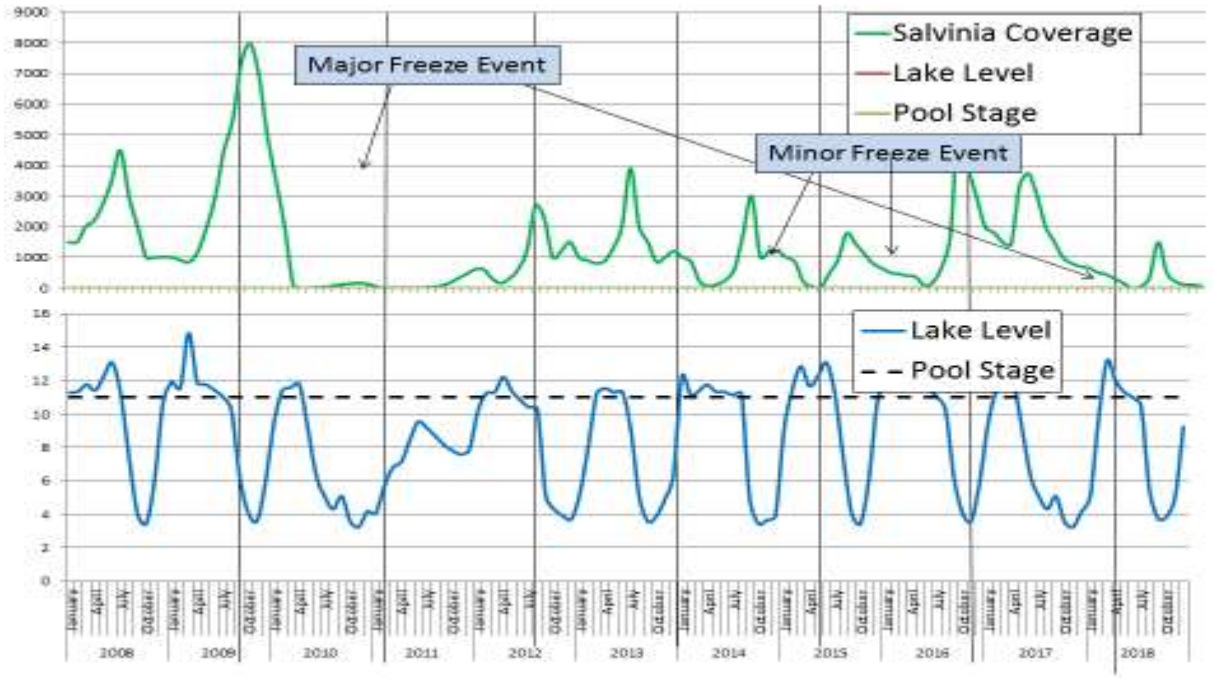


Figure 11. Annual giant salvinia coverage estimates and water levels for Lake Bistineau for 2008 – 2018.

Vegetation Type Maps

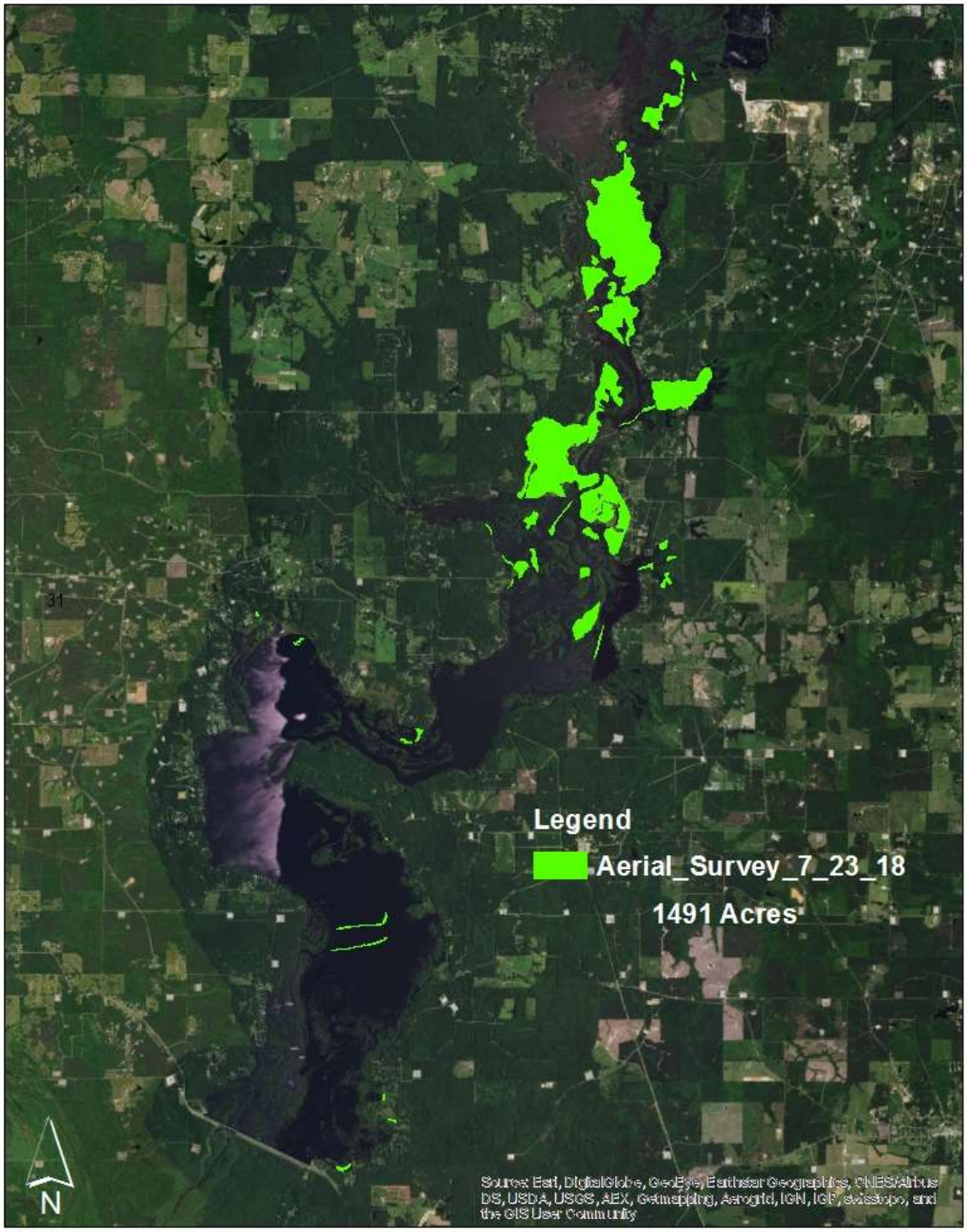
See MP-C Typemaps and Archives APPENDIX V for historical vegetation maps and survey narratives. The most recent vegetation surveys for Lake Bistineau are found in Figure 11 below.

Maps below show the expansion of giant salvinia in 2018 throughout the course of the year.

Lake Bistineau Giant Salvinia Coverage Estimate 1/25/18

Lake Bistineau Giant Salvinia Coverage Estimate 4/3/18

Lake Bistineau Giant Salvinia Aerial Survey 7-23-18



Lake Bistineau Giant Salvinia Aerial Survey 8-30-18

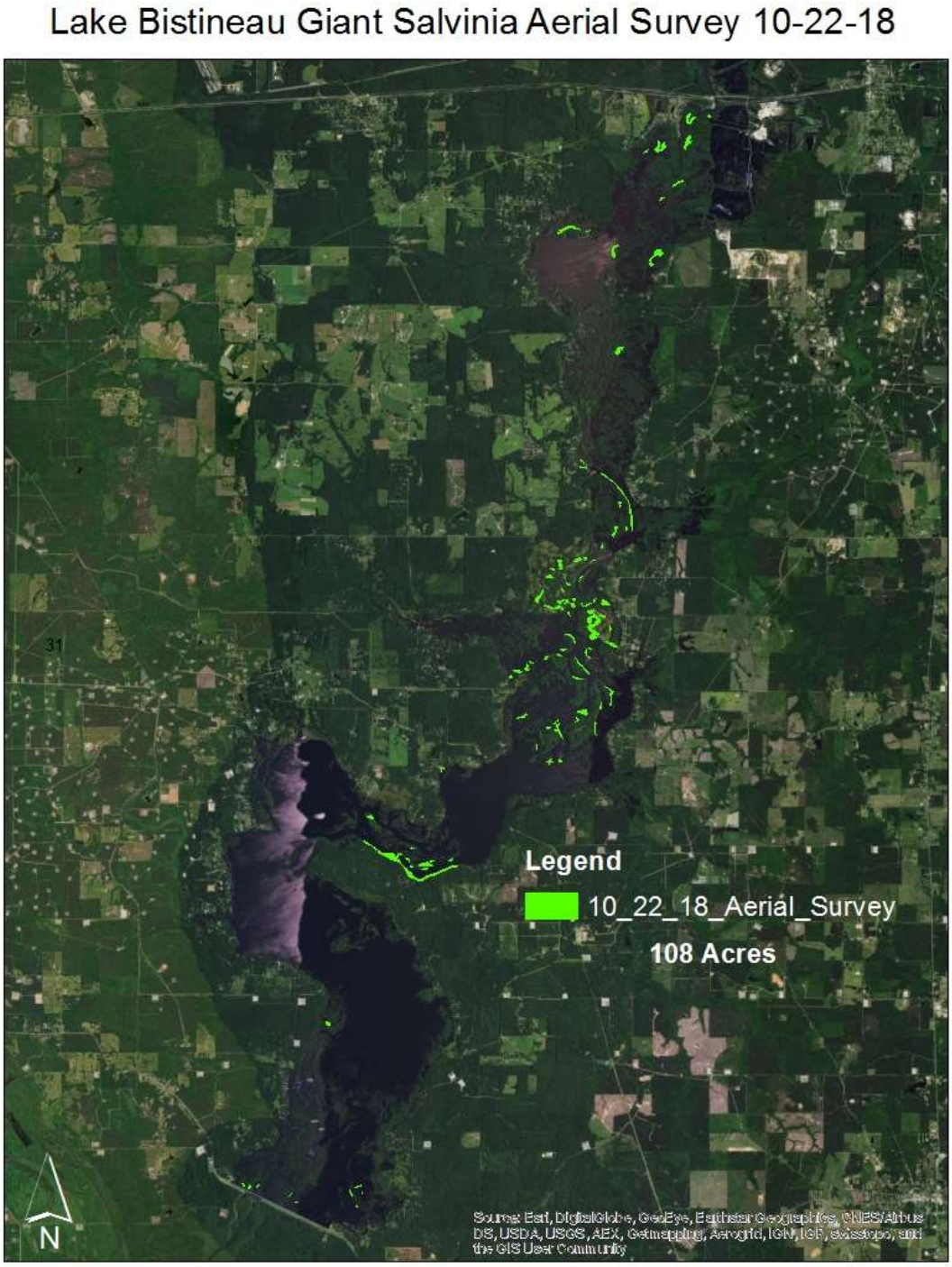


Figure 11. The 2018 vegetation type maps For Lake Bistineau, LA.

Vegetation Biomass Sampling
Sampling conducted in 1980, 1984,1999,2001,2002, and 2003.

Treatment History by Year Available
Biological

Insects useful for biological control of alligator weed in Louisiana include the alligator weed flea beetle (*Agasicles hygrophila*), alligator weed thrips (*Amynothrips andersoni*), and the alligator weed stem borer (*Arcola malloi*). The alligator weed flea beetle provides the best results of these biological control agents, and was first released into Louisiana in 1970. Alligator weed flea beetles were obtained from the USACOE in Jacksonville, FL and released in July 2012 in the northern part of Lake Bistineau. Beetle release areas were marked and spray crews were directed to avoid spraying herbicides in these areas.

Biological controls introduced in Louisiana for water hyacinth include the mottled water hyacinth weevil (*Neochetina eichhorniae*), the chevroned water hyacinth weevil (*Neochetina bruchi*) and the argentine water hyacinth moth (*Niphrograpta albiguttalis*). The mottled water hyacinth weevil provides the best control and has become widely established following its release at 492 sites in Louisiana during the 1970's. The status of the chevroned water hyacinth weevil is uncertain on Lake Bistineau and elsewhere in Louisiana. There is no specific information available as to whether Lake Bistineau was a release site for any of these species when they were first introduced in the state.

Giant salvinia weevils (*Cyrtobagous salviniae*) were initially introduced in August of 2007 when weevil-infested salvinia was transported to Lake Bistineau from Toledo Bend Reservoir. The weevils were introduced into two enclosures in August 2007. The weevils survived the first winter and their populations increased in the enclosures. Weevil-infested salvinia in the two original enclosures was transferred to floating enclosures designed to fluctuate with water level. Weevil-infested salvinia was also distributed to areas that are difficult to access to establish "nursery areas".

Additional weevil-infested giant salvinia (42 cubic feet) was introduced in October of 2008 from LSU's rearing facility near Gheens, LA. A major weevil stocking effort began on June 15, 2009. During the two-week effort, over 78,000 lbs. of giant salvinia infested with over 1.8 million adult weevils were relocated to Lake Bistineau. The weevils were stocked in an area which sustains water during a drawdown and had harbored giant salvinia for over two years. Containment devices were placed to hold the weevil-infested salvinia in the stocking location. Approximately 50 LDWF personnel were involved in the harvesting, transport and stocking efforts.

Samples taken after the freeze event of January 2010 indicated that few, if any, weevils had survived. Since 2010, an additional 535,686 weevils have been stocked on Lake Bistineau. Stocking locations have been monitored and follow-up samples collected. Annually, weevil populations are established after stocking and begin to slowly expand until reaching maximum numbers around October-November. With the onset of winter, the population begins a sharp down-turn annually, and by early spring very few weevils remain alive. LDWF has partnered with entomologists from LSU Agriculture Center and the U.S. Army Corps. Of Engineers to study the populations and hopefully develop characteristics that make the weevil better adapted to survive in the northwest Louisiana climate.

Table 5. Salvinia weevil stockings in Lake Bistineau for 2007-2018.

Year	# Weevils	Source
2007	3,600	Toledo Bend (Texas Parks and Wildlife assistance)
2008	628	LSU (Gheens)
2009	1,800,000	LSU (Gheens)
2012	48,200	COE (Lewisville)
2013	149,900	COE (Lewisville)
2014	205,834	COE (Lewisville)
2015	80,290	COE (Lewisville), Red River Waterway Commission (RRWC) in Colfax, LA
2016	96,586	COE (Lewisville), LSU (St. Gabriel), LDWF (Indian Creek via RRWC Colfax)
2017	248,565	COE (Lewisville), LDWF (Iatt Lake), RRWC (Colfax)

Even in small, closely monitored enclosures, no measurable success or control has been achieved by salvinia weevils on Lake Bistineau. According to The Salvinia Control Manual published by the Australian Government, it will take 3 or more years to see noticeable results from the introductions of salvinia weevils in temperate climates if they are effective at all. It has become apparent that weevil numbers drop greatly each year during the winter. Therefore,

weevil numbers are lowest at the point when the weather begins to warm and salvinia rapidly multiplies. Following the freeze events of 2010, 2014, and 2015, the majority of the weevils did not survive.

In addition to direct mortality, the weevils are only able to reproduce from approximately May 1-October 15 in the northwest Louisiana climate (when water temperatures >70°F). The expected lifespan of the weevil is only 3-6 months; therefore, most of the existing population will die of old age before the weather warms enough to again allow reproduction. Only a few individuals will survive even a mild winter (Figure 12). If the winter is severe, the salvinia will be severely damaged and not provide quality food or sufficient plant densities to sustain a significant weevil population. In order for salvinia weevils to assist in the control of the plants, the weevils must be able to withstand at least normal winter conditions without having a significant decline in population.

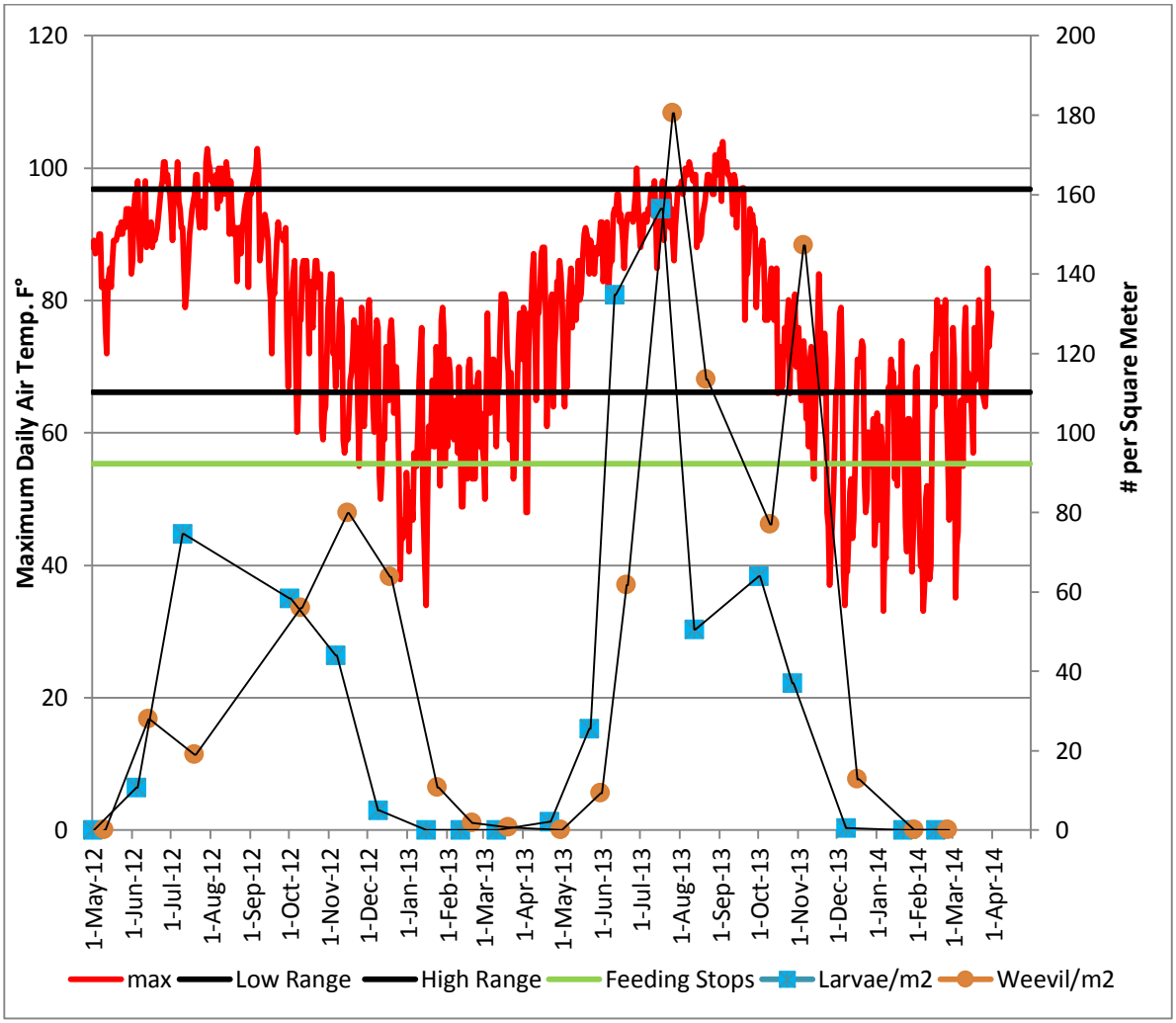


Figure 12. Number of adult salvinia weevils and larvae per square meter of vegetation from seven monitored sites on northwest Louisiana lakes (including Lake Bistineau), from May 2012-March 2014. Bold lines represent the range of temperatures where weevils can successfully reproduce.

Figure 13 illustrates how the climate of northwest Louisiana (Shreveport) is quite different from that of most locations where the weevil has been successfully established. According to the scientific literature, most locations where weevils have become successfully established are near the equator and do not experience as wide a range of temperatures as are experienced in northwest Louisiana. Consequently, water temperatures remain in a range where the weevil can reproduce throughout the year. This allows the insect population to experience exponential growth within 12-18 months to provide the sufficient numbers required to control the plant.

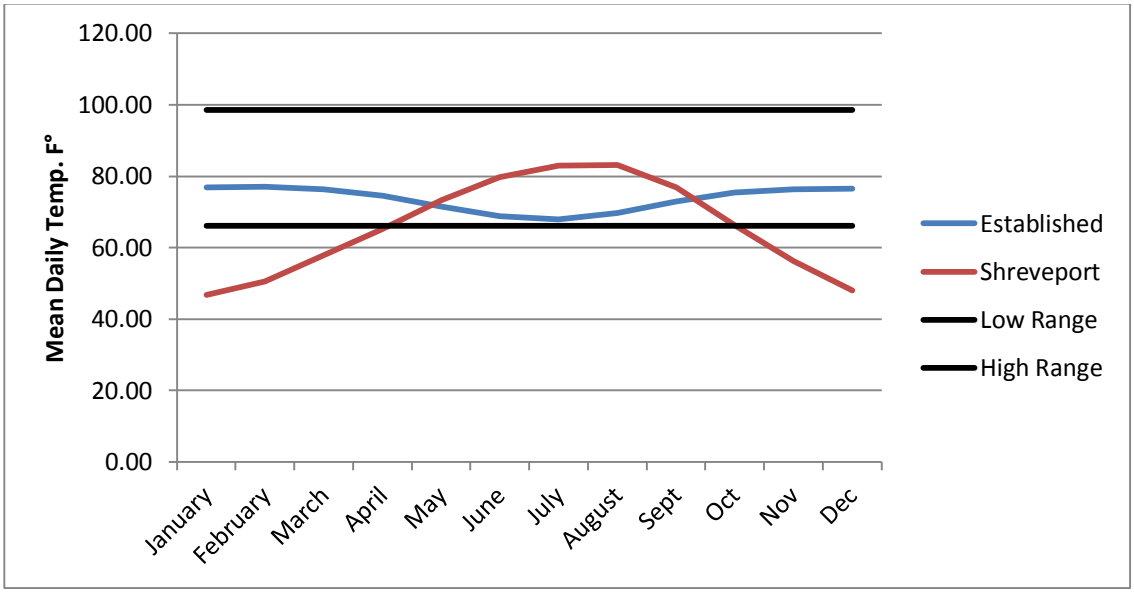


Figure 13. The 50-year, average daily temperatures in areas where the salvinia weevil (*Cyrtobagous salviniae)* has been successfully established as reported in the literature compared to Shreveport, LA. Bold lines represent the reproductive range of the weevil.

Figure 14. Close up photo of the giant salvinia weevil, (*Cyrtobagous salviniae*) on the leaves of its host plant.

Chemical

Table 6. Annual plant coverage and acres treated on Lake Bistineau for 2005 – 2018.

Treatment Year	**Primary Plant Species**	**Herbicides Used**	**Acres Treated**
2005	Alligator weed, primrose	2,4-D- (0.5 gal/acre) Aquamaster- (0.75 gal/acre)	280
2006	Alligator weed, giant salvinia, water hyacinth	2,4-D- 102.75 gals. (0.5 gal/acre) AquaMaster- 210 gals. (0.5 gal/acre) Aquastar- 286 gals. (0.5 gal/acre) Renovate-35.5 gals. (0.5 gal/acre) Reward-170.5 (1 gal/acre & 2 gal/acre)	1,442

2007	giant salvinia, alligator weed, water hyacinth	2,4-D- 40.5 gals. (0.5 gal/acre) Aqua Master- 1,970 gals. (1 gal/acre & 0.75 gal/acre) Aquanet- 475 gals. (1 gal/acre) Aquathol Super K-50 pounds (50 #'s/acre) Killzall – 29 gals (0.75 gal/acre) Renovate – 120 gals. (0.5 gal/acre) Reward-1,548.9 (1 gal/acre & 2 gal/acre)	5,292
2008	giant salvinia, alligator weed, water hyacinth	Unknown – 19 2,4-D – 52 gals. (0.5 gal/acre) Aqua Master – 3,966.5 gals. (0.75 gal/acre & 1 gal/acre) Aquastar – 1,413.75 (0.75 gal/acre & 1 gal/acre) Diquat E Pro 2L – 93.5 gals. (0.25 gal/acre & 1 gal/acre) Reward – 685.5 gals. (0.25 gal/acre & 1 gal/acre)	8,027
2009	giant salvinia, alligator weed	Unknown – 8 2,4-D – 2.5 gals. (0.5 gal/acre) Aqua Master – 2,132 gals. (0.75 gal/acre & 1 gal/acre) Aquastar – 795.75 gals. (0.75 gal/acre) Diquat E Pro 2L –1,040 gals. (0.25 gal/acre, 1 gal/acre & 2 gal/acre) Reward – 49 gals. (1 gal/acre) Knockout – 153 gals. (1gal/acre) Galleon – 192 gals. (0.15 gal/acre)	6,180

2010	giant salvinia, alligator weed	Unknown 46.7 Aqua Master – 498.5 (0.75 gal/acre & 1 gal/acre) Diquat E Pro 2L – 18 gals. (1gal/acre) Killzall – 16.5 gals. (1 gal/acre) Knockout – 1,355.64 gals (0.25 gal/acre & 1 gal/acre) Tribune – 27.5 gals. (1 gal/acre)	2,165
2011	giant salvinia, alligator weed, duckweed, watermeal, primrose, pennywort	Unknown – 25 Aqua Master – 606.5 gals. (0.75 gal/acre) Clearcast – 136.31 gals. (0.5 gal/acre) Killzall – 91.5 gals. (1gal/acre) Knockout – 4,409.1 gals. (0.25 gal/acre & 1 gal/acre) Sonar AS – 23 gals Tribune – 427 gals. (0.25 gal/acre & 1 gal/acre)	6,236
2012	giant salvinia, alligator weed, duckweed, mosquito fern	Unknown – 102.5 Aqua Master – 955.25 gals. (0.75 gal/acre) Clearcast – 11 gals. (0.5 gal/acre) Ecomazapyr 2SL – 42.5 gals. (0.5 gal/acre) Knockout – 192.5 gals. (0.25 gal/acre, 1 gal/ace & 2 gal/acre) Tribune – 5,362.56 gals. (0.25 gal/acre, 1 gal/acre & 2 gal/acre)	7,875
2013	giant salvinia, alligator weed,	Unknown – 155 Aqua Master – 3,410.1 gals. (0.75 gal/acre & 1 gal/acre)	7,654

		Rodeo – 1,114 gals (0.75 gal/acre & 1 gal/acre) Tribune – 1,168.07 gals. (0.25 gal/acre and 0.75 gal/acre)	
2014	giant salvinia, alligator weed	Unknown – 50 Aqua Master – 62.32 gals. (0.75 gal/acre) Clearcast – 2 gals. (0.25 gal/acre) Diquat E Pro 2L – 10.3 gals (0.25 gal/acre) Knockout – 0.5 gals (0.25 gal/acre) Round-Up Custom – 2,512.65 gals. (0.75 gal/acre) Tribune – 524.5 gals. (0.25 gal/acre & 0.75 gal/acre)	4,275
2015	giant salvinia, alligator weed	Unknown—19 Glyphosate 5.4—41475 gals. (0.75 gal/acre) Round-Up Custom—1,818 gals. (0.75 gal/acre) Tribune—405.5 gals. (0.25 gal/acre & 0.75 gal/acre)	3,490
2016	giant salvinia, alligator weed	Aquaneat- 66.38 gals. (0.75 gal/acre) Ecomazapyr 2SL- 4 gals. (0.5 gal/acre) Round-Up Custom- 2,204.5 gals. (0.75 gal/acre) Tribune- 1,416 gals. (0.25 gal/acre & 0.75 gal/acre)	4,990
2017	Giant salvinia	Aquaneat- 31.5 gals (0.75 gal/acre)	15,024

		Round-Up Custom- 8,748.3 gals. (0.75 gal/acre) Tribune- 2,439.7 gals (0.25 gal/acre & 0.75 gal/acre)	
2018	Giant salvinia	Aquaneat- 23.25 gals. (0.75 gal/acre) Round-Up Custom- 1,740 gals. (0.75 gal/acre) Tribune-601.5 gals. (0.25 gal/acre & 0.75 gal/acre)	2,619

Evaluation of Other Control Methods and Aquatic Vegetation Experiments

LDWF personnel have evaluated numerous alternate control methods for giant salvinia by conducting field trials and laboratory experiments. Experiments have included, but are not limited to: salinity solution exposure, applications of salt spray, applications of granular salts, microwave damage to salvinia, freeze trials, mechanical removal trials, shoreline conveyor trials, evaluation of multiple harvester machines, desiccation exposure trials, lake bed dry-out experiments, use of vinegar, drawdown exclosures, cold weather herbicide application tests, aerial applications, eight various herbicide trials of alternate mixtures and rates including input from industry leaders and herbicide manufacturers, provided material and equipment for endocide trials, bio-herbicide trials with Louisiana Tech University, grass carp feeding trials, weevil monitoring and extraction methods, and salvinia growth rate experiments.

In discussions with the public, there are several control methods that are commonly discussed. LDWF has assessed these options and they have been determined to either be not effective, unable to be utilized on a large scale, or are cost-prohibitive.

1. Mechanical Harvesters including the "Water Mower:"

   LDWF has operated a shoreline harvester, evaluated a conventional commercial harvester on nearby Caddo Lake, and evaluated the Water Mower on three separate occasions. There is an open invitation for such equipment to be demonstrated to LDWF to determine if it can be a cost effective tool. In general, harvesters are slow and costly to operate. Based upon quantified field trials, these types of machines have been demonstrated to only cover 3-4 acres per day and are estimated to cost more than five times what "traditional" herbicide applications cost per acre. Therefore, these types of machines are not practical to use on a large scale. They may have a use in relatively

small and open areas that can be cleaned quickly while preventing re-infestation from nearby areas. The LDWF evaluation of the Water Mower is contained in Part C of this document.

2. Triploid grass carp:

   In 2008, LDWF conducted trials in a pass-flow aquaculture system in Gheens, LA to evaluate if grass carp could be successfully used to control giant salvinia. Carp were held in pens with concrete bottoms and 4 treatments were applied with 10 fish per pen: 100% covered, 50% covered, 0% covered + fish food, and a control (no carp). Each trial was performed in triplicate and the fish were weighed and measured at the beginning and end of the trials. The grass carp were left to feed on salvinia for 105 days. Those fish that were placed in the pens with no salvinia and fed fish feed, gained approximately 2.5 pounds during the trials, while the carp in both the 100% and 50% trials lost weight. Stomach analysis of the carp indicated that they were not consuming salvinia and were actually ingesting mud for nutrition.

3. The use of salinity to control giant salvinia:
   Giant salvinia is a freshwater plant and will die when exposed to salinity levels of approximately 7 parts-per-thousand (ppt). In order to "treat" Lake Bistineau with enough salt to reach 7 ppt, an estimated 2,946,553,938 pounds of salt would be needed. This one-time treatment is estimated to cost in excess $29,465,540. If such an application were to be made, the salt would be diluted with the first rain event and the habitat would return to suitable conditions for salvinia to grow. Additionally, many negative environmental impacts would likely occur. Sunfish such as bass and crappie cannot reproduce at 3 ppt, and begin to die at 8 ppt. Cypress trees die between 5-10 ppt with increased exposure time, and freshwater invertebrates die at very low salinities. The legalities of using salt as an herbicide are unknown, but it is not approved to be used as such by the Environmental Protection Agency.

HISTORY OF REGULATIONS

Recreational

Statewide regulations for all fish species, the recreational fishing regulations may be viewed at the link below:

http://www.wlf.louisiana.gov/regulations

Commercial

The commercial fishing regulations may be viewed at the link below:

http://www.wlf.louisiana.gov/regulations

Commercial netting was prohibited in Lake Bistineau in January of 1978. Cast nets, slat traps, trot and set lines, and wire nets may be used commercially.

For all other commercial regulations, statewide regulations have been in effect on Lake Bistineau since impoundment.

DRAWDOWN HISTORY

Table 7. The drawdown history of Lake Bistineau for the period 1945 – 2018.

Year	Date(s)	Depth Below Pool	Purpose and Success
1945	7/26/45 -- ??	Unknown	Vegetation Control
1951	Unknown	Unknown	Remodeling of dam to raise pool level from 137 ft. NGVD to 141 ft. NGVD
1962	Unknown Late Sept., 1962--??	4 Feet	Began sometime after Sept 25, 1962. Lake was to be lowered 4 feet and then close the gates. Reason for drawdown stated as "of utmost importance to the fishing welfare" and the drawdown action "followed many requests from fishermen and camp owners (commercial) on Lake Bistineau."
1963	9/2/63-10/15/63	4 Feet	Vegetation Control. Lake to be lowered 4-6 inches/day until reach 4 feet below pool, then maintain that level for 30 days. "In no event shall the gates be opened after October 15, 1963.
1966	Labor Day—	5 Feet	Vegetation control—water hyacinths(Proposed 5-year consecutive drawdown schedule)
1967	Labor Day—Dec. 15	5 Feet	Vegetation control—water hyacinths. Plan called to drop the lake 4 feet and hold until after teal season, then dewater to 5 feet below pool until December 15.
1968	Labor Day—	5 Feet	Vegetation control—water hyacinths Reached pool stage on 12/19/68
1969	Labor Day—	5 Feet	Vegetation control—water hyacinths Reached pool stage on 1/14/70

1970	Labor Day—	5 Feet	Vegetation control—water hyacinths Reached pool stage on 2/27/71
1971	Labor Day—	5 Feet	Vegetation control Reached pool stage on 1/15/72
1975	Labor Day—1/10/76	*7 Feet	Vegetation control—water hyacniths and submergent vegetation Reached pool stage on 2/29/76
1980	Labor Day—Jan 8	*7 Feet	Fish population management and preemptive vegetation control Did not reach pool stage until 5/19/81
1983	Labor Day—Jan 8	*7 Feet	Vegetation control—water hyacinths Reached pool stage on 2/18/84
1996	Labor Day—9/3/96—1/31/97	*7 Feet	Vegetation control—Hydrilla Successful drawdown except lake level began to rise in December, nearly reaching pool stage on Dec. 12. The lake then only slightly dewatered and was once again above pool stage on Jan. 27, 1997 prior to the gate closing.
2000	Labor Day—9/5/00 – 1/29/01	**7 Feet	Vegetation control and bottom habitat improvement (Note: High water event once lake reached 134 ft MSL. Reached pool stage 12/28/00)
2004	7/15/04—1/31/05	**7 Feet	Bottom habitat improvement with the secondary benefit of vegetation control -- (1st year—Proposed 3-year consecutive drawdown schedule) Reached pool stage on 12/4/04
2005	7/15/05—1/31/06	**7 Feet	Bottom habitat improvement with the secondary benefit of vegetation control —(2nd year—Proposed 3-year consecutive drawdown schedule)

			Extremely successful due to drawdown's coincidence with drought conditions. The results exceeded the expectations and the third scheduled drawdown in the series was cancelled. Reached pool stage on 3/22/06
2008	7/15/08—2/2/09	**7 Feet	Veg. control—This is the first attempt to reduce giant salvinia coverage via drawdown. Successful reduction of 4,500 acres in July '08 to 850 acres in February '09. Reached pool stage on 3/24/09
2009	9/16/09-7/16/10	**7 Feet	As a result of the drawdown initiated on September 16, 2009, Lake Bistineau did not reach the target drawdown level of 7 feet below normal pool stage until mid-June 2010. Two flood events cause the lake to rise to 5.5 feet and 6.5 feet above pool in October and November. Gates were closed on 7/16/10, but drought conditions did not allow lake to return to pool until 1/15/12.
2012	8/6/12-1/31/13	**7 feet	Veg. control- 2674 acres of salvinia triggered drawdown. (80% of material was on the north end of the lake). Gates closed on 10/15/12 to allow refill for secondary water fluctuation. Gates opened on 1/16/13 in an effort to strand additional plants for freezing or drying if weather allowed. Lake only dropped 1.4 ft. below pool during this time, so little benefits were gained. Salvinia reduced to approximately 800 acres by March 2013. Reached pool stage on 2/21/13
2013	6/24/13-12/2/13	**7 feet	Veg. Control-3,899 acres of salvinia triggered drawdown. 1,017 acres remained at completion of drawdown. Gates closed for first time in December in effort to maximize recreational opportunities with the lake at full pool. Lake Reached pool stage on 12/18/13. The winter of 2013-2014 provided harsh freeze conditions that further reduced the salvinia to an estimated 56 acres by March.

2014	8/4/14-1/15/15	**7 feet	Veg. Control-1,725 acres on 7/14/14 triggered drawdown. Gates scheduled to be closed on Dec. 1. Date altered after public opinion survey conducted by BTF showed all interests groups desired the gates to remain open longer. New closing date became Jan. 15, 2015. Lake reached pool stage on 1/25/15.
2015	8/3/15-1/15/16	8 feet	Veg. Control-1,781 acres of salvinia on 7/17/15 triggered drawdown. Reached pool stage on 12/14/15
2016	8/15/16— 11/30/16	8 feet	Veg. Control-1,743 acres of salvinia on 7/13/16 triggered drawdown per LDWF approved Management Plan. The drawdown was delayed 3 weeks until 8/15. See Management Issues section above for complete details. Reached pool stage on 1/25/17
2017	5/1/17-1/26/18	8 feet	Veg. Control-3,742 acres of salvinia prompted an early drawdown in May. Mild winter combined with expansion of plants from 2016 drawdown delay were contributing factors. Gates set to close on 11/30/17. but were not closed until 1/26/18 due to contract delays to perform repair work in the outflow channel by LDOTD. Reached pool stage on 2/21/18
2018	7/23/18- 12/17/18	8 feet	Veg. Control-opening delayed one week from LDWF approved Management Plan by administrative staff. Closing date not set by LDWF administrative staff. Lake rose above pool stage with gates open on 12/14/18 and reached minor flood stage on 12/17/18, prompting DOTD to close the gates under emergency plan (erosion concerns).

*-These drawdowns were requested to be "maintained at 7 feet below pool, with gates to remain open until desired closing date." These drawdowns were likely 8 feet below pool as the maximum drawdown level was incorrectly noted in both DOTD and LDWF files for a period of time.

**These drawdowns were requested as "maximum drawdown of 7 feet below pool." Maximum drawdown level for the lake is actually 8 feet below pool.

FISH KILLS/ DISEASE HISTORY, LMBV

Minor to moderate fish kills occur occasionally on Lake Bistineau. During the period 1996 to 2017, LDWF received notice and made a field investigation for seven kills on Lake Bistineau. Nearly all of these were due to low dissolved oxygen (DO), occurred in shallow weedy areas, and involved low numbers of sport fish. One involved a few game fish that likely had been placed in a live basket and then died. There is often a fish kill below the Bistineau Dam when waters recede following high water periods. These kills are only rarely reported as the public generally understands what is causing the problem. Kills in this area can involve fairly large numbers of sport or recreational fish.

Largemouth Bass Virus (LMBV) was documented on Lake Bistineau when 2 individuals from a sample of 60 largemouth bass collected on 5-6-02 sent to Warm Springs Regional Fisheries Center in Georgia tested positive for largemouth bass virus. A sample of 20 bluegill and 20 redear collected on the same date did not return any positive results for LMBV. No fish kills have occurred on Lake Bistineau for which LMBV was a suspected factor.

CONTAMINANTS/POLLUTION

Mercury

The latest fish consumption advisory from DEQ and DHH for Lake Bistineau relating to mercury contamination was released on 3-8-06:
Women of childbearing age and children less than seven years of age should consume no more than ONE MEAL PER MONTH of bowfin (choupique, grinnel) from the advisory area.

Other adults and children seven years of age and older should consume no more than FOUR MEALS PER MONTH of bowfin (choupique, grinnel) from the advisory area.

Unless the fish species is specifically addressed in the details of the advisory, please limit consumption of all species in an advisory area to FOUR MEALS PER MONTH.

The current fish consumption advisories can be found at:
http://deq.louisiana.gov/page/fishing-consumption-and-swimming-advisories

Water Quality

The Louisiana Department of Environmental Quality (DEQ) routinely samples Lake Bistineau and other water bodies throughout the state for ambient water quality. No advisories have been issued for Lake Bistineau related to ambient water quality parameters. Ambient surface water quality data from DEQ can be viewed at:
http://deq.louisiana.gov/page/ambient-water-quality-monitoring-data

Issues regarding sewage discharge are controlled by DEQ and the Louisiana Department of Health and Hospitals (DHH).

BIOLOGICAL

Fish sampling history

Lake Bistineau fish populations have been sampled since impoundment to present (Table 8).

Table 8. The historical and scheduled fish sampling history, gear types, and effort on Lake Bistineau for the period 1956 – 2019.

Lake Bistineau Fish Sampling	
1956	Experimental Flag Gill Nets—March-August—70 Sets Each net 175 yds. with 25 yds. of the following mesh size: 1.0, 1.5, 2.0, 3.0, 3.5 and 4.5-inch sq. mesh. Nets were hung on a ½ basis.
1966	2-Trammel Net Sets(Unknown Webbing)
1970	5-One Acre Rotenone Sets
1971	3- 24 hr. Trammel Net Sets—500 yards of webbing (1.5" - 100 yds./ 2.0" - 100 yds./ 2.5" - 100 yds./ 3.0" - 200 yds.) 9-Hoopnet Sets (2" Webbing/48-hour soak) 6-Hoopnet Sets (1" Webbing/48-hour soak) 12-Hoopnet Sets (Unknown Webbing/ 24-hour soak) 5-One Acre Rotenone Sets
1972	4-One Acre Rotenone Sets
1973	5-One Acre Rotenone Sets
1974	2- 24 hr. Trammel Net Sets—300 yards of webbing/Set (1.5" – 100 yds./ 2.0" – 100 yds./ 3.0" – 100 yds.) 8-One Acre Rotenone Sets
1975	5-One Acre Rotenone Sets
1976	3 – Summer Gill Net Sets—450' of webbing (Unknown Web Size) 1 – Winter Gill Net Set (Unknown Size) 21-One Acre Rotenone Sets
1976 – 1977	13 – 3" Flag Net Sets 11 – 4" Flag Net Sets 12 – 3" Leaded Gill Net Sets 12 – 4" Leaded Gill Net Sets

	13 – 3” Trammel Net Sets 11 – 4” Trammel Net Sets
1977	23-One Acre Rotenone Sets
1978	20 – 3” Flag Net Sets 23 – 4” Flag Net Sets 23 – 3” Leaded Gill Net Sets 27 – 4” Leaded Gill Net Sets 25 – 3” Trammel Net Sets 24 – 4” Trammel Net Sets 12-One Acre Rotenone Sets
1979	13 – 3” Flag Net Sets 13 – 3.5” Flag Net Sets 13 – 4” Flag Net Sets 18 – 3” Leaded Gill Net Sets 16 – 3.5” Leaded Gill Net Sets 22 – 4” Leaded Gill Net Sets 22 – 3” Trammel Net Sets 18 – 3.5” Trammel Net Sets 19 – 4” Trammel Net Sets 21-One Acre Rotenone Sets
1979-1985	Largemouth Bass & Striped Bass Tag Recovery Project Largemouth Bass--Fish were captured by electrofishing, tagged, and released. Most recaptures were via hook & line. Many of the recaptures were retagged for continuation of the study. Most LMB moved less than 0.5 miles; however, some bass did relocate as far as 6 miles from the initial tagging location. Striped Bass—Fish were caught in gill nets, tagged, and released. Unable to locate any recapture data.
1980	8 – 3” Flag Net Sets 3 – 3.5” Flag Net Sets 8 – 4” Flag Net Sets 17 – 3” Leaded Gill Net Sets 5 – 3.5” Leaded Gill Net Sets 18 – 4” Leaded Gill Net Sets 15 – 3” Trammel Net Sets 6 – 3.5” Trammel Net Sets 16 – 4” Trammel Net Sets 15-One Acre Rotenone Sets
1981	11-One Acre Rotenone Sets
1982	1 – 2” Trammel Net Set (100 yds.) 1 – 2 3/8” Trammel Net Set (100 yds.) 1 – 3” Trammel Net Set (100 yds.) 12-One Acre Rotenone Sets

1983	13-One Acre Rotenone Sets
1984	3” Mono Gill Nets (200 yds.) 3” Nylon Gill Nets (300 yds.) 3.5” Nylon Gill Nets (400 yds.) 4” Nylon Gill Nets (200 yds.) 4-Wire Trap Sets, 1 Inch, No Bonnet 4-Wire Trap Sets, 1.5 Inch, No Bonnet 4-Wire Trap Sets, 1 Inch, Vertical Bonnet 4-Wire Trap Sets, 1.5 Inch, Vertical Bonnet 4-Wire Trap Sets, 1 Inch, Horizontal Bonnet 4-Wire Trap Sets, 1.5 Inch, Horizontal Bonnet 2-Wire Trap Set, 1 Inch, Fished As “Lost” 5-One Acre Rotenone Sets
1985	4-Wire Trap Sets, 1 Inch, No Bonnet 4-Wire Trap Sets, 1.5 Inch, No Bonnet 4-Wire Trap Sets, 1 Inch, Vertical Bonnet 4-Wire Trap Sets, 1.5 Inch, Vertical Bonnet 4-Wire Trap Sets, 1 Inch, Horizontal Bonnet 4-Wire Trap Sets, 1.5 Inch, Horizontal Bonnet 2-Wire Trap Set, 1 Inch, Fished As “Lost” 8-One Acre Rotenone Sets
1986	5-One Acre Rotenone Sets
1987	6-One Acre Rotenone Sets
1988	5-One Acre Rotenone Sets
1989	6-One Acre Rotenone Sets
1990	Electrofishing 2-15 Minute Samples—Spring Electrofishing 5-15 Minute Samples—Fall/Includes 2 Forage Samples 9—25’ Seine, ¼ Inch Bar, 1 Quadrant Sets
1991	4—Frame Net Sets, 0.5 Inch Bar, 3’ x 6” Frame
1992	Electrofishing 2-15 Minute Samples—Spring Electrofishing 3-15 Minute Samples—Fall/Includes1 Forage Sample 3-One Acre Rotenone Sets
1993	Electrofishing 2-15 Minute Samples—Spring Electrofishing 3-15 Minute Samples—Fall/Includes 1 Forage Sample
1994	Electrofishing 3-15 Minute Samples—Spring
1995	Electrofishing 3-15 Minute Samples—Spring Electrofishing 3-15 Minute Samples—Fall

1996	3—300’ Gill Net Sets, 2.5 Inch Bar, Mono 3—300’ Gill Net Sets, 3 Inch Bar, Mono 3—300’ Gill Net Sets, 3.5 Inch Bar, Mono 3—300’ Gill Net Sets, 4 Inch Bar, Mono Electrofishing 3-15 Minute Samples—Spring
1997	Electrofishing 9-15 Minute Samples—Spring Electrofishing 9-15 Minute Samples—Fall/Includes 1 Forage Sample
1998	Electrofishing 8-15 Minute Samples—Spring Electrofishing 10-15 Minute Samples—Fall/Includes 2 Forage Samples
1999	Electrofishing 8-15 Minute Samples—Spring Electrofishing 9-15 Minute Samples—Fall/Includes 1 Forage Sample
2000	Electrofishing 8-15 Minute Samples—Spring 8-One Acre Rotenone Sets
2001	Electrofishing 8-15 Minute Samples—Spring Electrofishing 9-15 Minute Samples—Fall/Includes 1 Forage Sample 10—25’ Seine, ¼ Inch Bar, 1 Quadrant Sets
2002	Electrofishing 8-15 Minute Samples—Spring Electrofishing 9-15 Minute Samples—Fall/Includes 1 Forage Sample 10—300’ Gill Net Sets, 2.5 Inch Bar, Mono 10—300’ Gill Net Sets, 3 Inch Bar, Mono 10—300’ Gill Net Sets, 3.5 Inch Bar, Mono 10—300’ Gill Net Sets, 4 Inch Bar, Mono
2003	Electrofishing 8-15 Minute Samples—Spring Electrofishing 9-15 Minute Samples—Fall/Includes 1 Forage Sample
2004	Electrofishing 8-15 Minute Samples—Spring
2005	Electrofishing 11-15 Minute Samples—Spring 9-25’ Seine Samples w/ ¼” Bar 12—300’ Gill Net Sets, 2.5 Inch Bar, Mono 12—300’ Gill Net Sets, 3 Inch Bar, Mono 12—300’ Gill Net Sets, 3.5 Inch Bar, Mono 12—300’ Gill Net Sets, 4 Inch Bar, Mono
2006	Electrofishing 9-15 Minute Samples—Spring Electrofishing 9-15 Minute Samples—Fall/Includes 1 Forage Sample 9-25’ Seine Samples w/ ¼” Bar
2007	Electrofishing 8-15 Minute Samples—Spring 7-25’ Seine Samples w/ ¼” Bar
2008	Electrofishing 9-15 Minute Samples—Spring 10—300’ Gill Net Sets, 2.5 Inch Bar, Mono 10—300’ Gill Net Sets, 3 Inch Bar, Mono 10—300’ Gill Net Sets, 3.5 Inch Bar, Mono 10—300’ Gill Net Sets, 4 Inch Bar, Mono

2009	Electrofishing 8-15 Minute Samples—Spring Electrofishing 9-15 Minute Samples—Fall / Includes 1 Forage Sample 9-25’ Seine Samples w/ ¼” Bar
2010	Electrofishing 8-15 Minute Samples—Spring Electrofishing 9-15 Minute Samples—Fall / Includes 1 Forage Sample 9-25’ Seine Samples w/ ¼” Bar
2011	Electrofishing 8-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples--Fall Forage-4-225 Second Samples
2012	Electrofishing 8-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples--Fall Forage-4-225 Second Samples
2013	Electrofishing 8-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples—Fall Forage-4-225 Second Samples
2014	Electrofishing 8-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples—Fall Forage-4-225 Second Samples 10—300’ Gill Net Sets, 2.5 Inch Bar, Mono 10—300’ Gill Net Sets, 3 Inch Bar, Mono 10—300’ Gill Net Sets, 3.5 Inch Bar, Mono 10—300’ Gill Net Sets, 4 Inch Bar, Mono
2015	Electrofishing 8-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples—Fall Forage-4-225 Second Samples
2016	Crappie and bass stock assessment (1st year) Electrofishing 11-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples—Fall Forage-4-225 Second Samples Leadnet sampling 12 stations-Fall 10—300’ Gill Net Sets, 2.5 Inch Bar, Mono 10—300’ Gill Net Sets, 3 Inch Bar, Mono 10—300’ Gill Net Sets, 3.5 Inch Bar, Mono 10—300’ Gill Net Sets, 4 Inch Bar, Mono
2017	Crappie and bass stock assessment (2nd year) Electrofishing 15-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples—Fall Forage-4-225 Second Samples Leadnet sampling 12 Stations-Fall Access Point Angler Creel

2018	Crappie and bass stock assessment (3rd year) Electrofishing 8-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples—Fall Forage-4-225 Second Samples Leadnet sampling 12 stations-Fall
2019	Electrofishing 15-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples—Fall Forage-4-225 Second Samples
2020	Electrofishing 15-15 Minute Samples—Spring Electrofishing 8-15 Minute Samples—Fall Forage-4-225 Second Samples

Lake Records

No lake records have been compiled; however, the Louisiana Outdoor Writers Association maintains a Louisiana fish records database. The following is a link to the LOWA records website:

http://laoutdoorwriters.com/louisiana-fish-and-big-game-records/louisiana-fish-records/

Table 9. State ranked fish records for Lake Bistineau, Louisiana.

Species	Weight (pounds)	Date	State Rank
White Crappie	3.44	February 2015	5
White Bass**	4.0	March 2010	3

**This fish caught at the confluence of Lake Bistineau and Bayou Dorcheat.

Stocking History

Table 10. The fish stocking history for Lake Bistineau, LA for 1975 – 2018.

Year	Species Stocked/ Number

1975	Striped Bass—436,340
1976	Striped Bass—200,852
1977	Striped Bass—185,500
1978	Striped Bass—155,000
1979	Striped Bass—179,800
1980	Striped Bass—8,100
1981	Striped Bass—84,311
1982	Striped Bass—175,062
1983	Striped Bass—175,000
1984	Hybrid Striped Bass—175,509
1985	Hybrid Striped Bass—203,788
1986	Hybrid Striped Bass—175,039
1987	Hybrid Striped Bass—187,307
1988	Hybrid Striped Bass—38,026
1991	Hybrid Striped Bass—129,980
1993	Hybrid Striped Bass—525,000 Sac Fry From Toledo Bend
1995	Hybrid Striped Bass—200,000 Sac Fry From Toledo Bend
1996	Hybrid Striped Bass—1,800,000 Sac Fry From TPWD-Possum Kingdom
1998	Florida Largemouth Bass—468,328 (Bass Life Associates & CLFH)
1999	Florida Largemouth Bass—388,949 (120,330 USFH-NAT, 52,000 BFFH, 216,619 CLFH) Hybrid Striped Bass—111,487 (93,639 BFFH, 17,848 MFH)
2000	Florida Largemouth Bass—459,269 (283,251 CLFH, 176018 BFFH)
2001	Florida Largemouth Bass—163,145 From CLFH

2002	Florida Largemouth Bass—171,963 (134,465 USFH-NAT, 37,498 CLFH)
2003	Florida Largemouth Bass—173,347 (90,987 CLFH, 82,360 BFFH)
2006	Florida Largemouth Bass—150,637 From CLFH
2007	Florida Largemouth Bass—311,735 (211,631 CLFH, 100,104 USFH-NAT)
2009	Florida Largemouth Bass—181,580 From BFFH
2014	Florida Largemouth Bass-288,266 (139,714 BW /12,726 BFFH/113,240 CLFH/22,586 USFH-NAT)
2015	Florida Largemouth Bass-339,686 (58,021 BW; 108,722 BFFH; 172,943 CLFH)
2017	Florida Largemouth Bass-66,046 (982 BW, 23,154 CLFH, 41,910 USFH-NAT)

BW – Beechwood Fish Hatchery

BFFH—Booker Fowler Fish Hatchery

CLFH—Cross Lake Fish Hatchery

MFH—Monroe Fish Hatchery

USFH-NAT—US Fish Hatchery/Natchitoches

Genetics

Table 11. The largemouth bass genetic analyses result for Lake Bistineau, 1989 – 2018.

Year	Number	Northern	Florida	Hybrid	Florida Influence
1989	60	100%	0%	0%	0%
1990	15	100%	0%	0%	0%
1995	34	100%	0%	0%	0%
1997	73	100%	0%	0%	0%
2001	52	94%	6%	0%	6%

2002	51	90%	0%	10%	10%
2006	64	92%	0%	8%	8%
2010	80	80%	1.25%	18.75%	20%
2016	179	80%	4.5%	15.5%	20%
2017	212	84%	1.9%	14.2%	16%
2018	209	81%	3.8%	15.3%	19%

Species profile

Fish collected or known to occur in the Lake Bistineau, LA watershed.

Paddlefish Family, POLYODONTIDAE
Paddlefish, *Polyodon spathula* (Walbaum)

Gar Family, LEPISOSTEIDAE
Spotted gar, *Lepisosteus oculatus* (Winchell)
Longnose gar, *Lepisosteus osseus* (Linnaeus)
Alligator gar, *Lepisosteus spatula* (Lacépède)

Bowfin Family, AMIIDAE
Bowfin, *Amia calva* Linnaeus

Freshwater Eel Family, ANGUILLIDAE
American eel, *Anguilla rostrata* (Lesueur)

Herring Family, CLUPEIDAE
Skipjack herring, *Alosa chrysochloris* (Rafinesque)
Gizzard shad, *Dorosoma cepedianum* (Lesueur)
Threadfin shad, *Dorosoma petenense* (Günther)

Minnow Family, CYPRINIDAE
Red shiner, *Cyprinella lutrensis* (Baird and Girard)
Grass Carp, *Ctenopharyngodon idella* (Valenciennes)
Common Carp, *Cyprinus carpio* Linnaeus
Golden shiner, *Notemigonus crysoleucas* (Mitchill)
Emerald shiner, *Notropis atherinoides* Rafinesque
Iron colored shiner, *Notropis chalybaeus* (Cope)

Taillight shiner, *Notropis maculatus* (Hay)
Weed shiner, *Notropis texanus* (Girard)
Bullhead minnow, *Pimephales vigilax* (Baird and Girard)

Sucker Family, CATOSTOMIDAE
River carpsucker, *Carpiodes carpio* (Rafinesque)
Lake chubsucker, *Erimyzon sucetta* (Lacépède)
Smallmouth buffalo, *Ictiobus bubalus* (Rafinesque)
Bigmouth buffalo, *Ictiobus cyprinellus* (Valenciennes)
Black buffalo, *Ictiobus niger* (Rafinesque)
Spotted sucker, *Minytrema melanops* (Rafinesque)

Freshwater Catfish Family, ICTALURIDAE
Black bullhead, *Ameiurus melas* (Rafinesque)
Yellow bullhead, *Ameiurus natalis* (Lesueur)
Brown bullhead, *Ameiurus nebulosus* (Lesueur)
Blue catfish, *Ictalurus furcatus* (Lesueur)
Channel catfish, *Ictalurus punctatus* (Rafinesque)
Tadpole madtom, *Noturus gyrinus* (Mitchill)
Flathead catfish, *Pylodictis olivaris* (Rafinesque)

Pike Family, ESOCIDAE
Chain pickerel, *Esox niger* Lesueur

Pirate Perch Family, APHREDODERIDAE
Pirate perch, *Aphredoderus sayanus* (Gilliams)

Killifish Family, CYPRINODONTIDAE
Golden topminnow, *Fundulus chrysotus* (Günther)
Starhead topminnow, *Fundulus nottii* (Agassiz)
Blackstripe topminnow, *Fundulus notatus* (Rafinesque)
Blackspotted topminnow, *Fundulus olivaceus* (Storer)

Livebearer Family, POECILIIDAE
Western mosquitofish, *Gambusia affinis* (Baird and Girard)

Silverside Family, ATHERINIDAE
Brook silverside, *Labidesthes sicculus* (Cope)

Temperate Bass Family, PERCICHTHYIDAE

White bass, *Morone chrysops* (Rafinesque)
Yellow bass, *Morone mississippiensis* Jordan and Eigenmann
Striped bass, *Morone saxatilis* (Walbaum)
Palmetto bass, *Morone saxatilis* □ X *Morone chrysops* □

Sunfish Family, CENTRARCHIDAE
Flier, *Centrarchus macropterus* (Lacépède)
Green sunfish, *Lepomis cyanellus* Rafinesque
Warmouth, *Lepomis gulosus* (Cuvier)
Orangespotted sunfish, *Lepomis humilis* (Girard)
Bluegill, *Lepomis macrochirus* (Rafinesque)
Dollar sunfish, *Lepomis marginatus* (Holbrook)
Longear sunfish, *Lepomis megalotis* (Rafinesque)
Redear sunfish, *Lepomis microlophus* (Günther)
Spotted sunfish, *Lepomis punctatus* (Valenciennes)
Bantam sunfish, *Lepomis symmetricus* Forbes
Spotted bass, *Micropterus punctulatus* (Rafinesque)
Florida largemouth bass, *Micropterus floridanus* (Kassler et al.)
Northern largemouth bass, *Micropterus salmoides salmoides* (Lacépède)
White crappie, *Pomoxis annularis* Rafinesque
Black crappie, *Pomoxis nigromaculatus* (Lesueur)

Perch Family, PERCIDAE
Bluntnose darter, *Etheostoma chlorosomum* (Hay)
Cypress darter, *Etheostoma proeliare* (Hay)
Logperch, *Percina caprodes* (Rafinesque)

Drum Family, SCIAENIDAE
Freshwater drum, *Aplodinotus grunniens* Rafinesque

<u>Threatened/ Endangered/ Exotic Species</u>
Endangered Species in Louisiana (delisted as a Federal Endangered Species)

Bald Eagle – Nest in vicinity of lake, utilizes lake during winter months

Invasive species that occur in the Lake Bistineau ecosystem include nutria, red fire ant, cattle egret, Eurasian collared dove, house sparrow, European starling, and grass carp. None have had a major impact on the fisheries communities of the lake, but several have impacted the ecosystems in other ways. Nutria cause some damage to trees, shrubs, and ornamental plants and may displace the native beaver and muskrat to an extent. Fire ants are the biggest nuisance

of these exotic animals as they infest virtually every cypress tree in the lake and likely have adversely impacted birds nesting and roosting in the cypress forests on Lake Bistineau.

Noxious exotic aquatic vegetation has been a major debilitating factor for Lake Bistineau for many years. Early vegetation problems were primarily caused by native vegetation. These problems have increased with displacement of the native aquatics by the exotics. Prior to the introduction of giant salvinia in 2006, water hyacinth, alligator weed, hydrilla, and parrot feather were the most troublesome plants in the lake. Since that time, giant salvinia has become the most severe invasive aquatic plant in Lake Bistineau.

ANGLER CREEL SURVEYS

A recreational angler creel census survey was conducted from May 1955 through August 1956. This study was led by Victor Lambou and Herbert Stern. Additional creel surveys were performed by LDWF personnel from April through September 1977, March through October 1978, March through October 1979, and January through December 1989.

An access-point creel survey was conducted on Lake Bistineau in 2017. LDWF staff interviewed lake users at the conclusion of their trips during 72 interview days from January to December. The average angler drove 17.78 miles to fish Lake Bistineau. A total of 516 parties were interviewed. An estimated 54% of anglers pursued largemouth bass, 31% pursued crappie, 5% pursued bream, and 6 % were waterfowl hunters. Water sports enthusiasts were likely underrepresented in this survey, since 2017 was an unusual year with a drawdown commencing prior to the peak watersports season.

HYDROLOGICAL CHANGES

Lake Bistineau was impounded in 1938. The pool level was raised 4’ in 1951 to 141’ NGVD. No major permanent hydrological changes have occurred since pool level was reached in 1951.

WATER USE

Fishing

Excellent recreational fishing opportunities exist on Lake Bistineau. Anglers enjoy good fishing for largemouth and spotted bass, crappie, bream, channel and flathead catfish, and

white bass, utilizing various fishing techniques. Shoreline fishing opportunities exist at the fishing pier at the dam, the Lake Bistineau State Park, and other public and private launch facilities. Because the lake remains accessible during drawdowns, anglers report good success during these periods even during the warm summer months.

Hunting

Lake Bistineau offers opportunities for waterfowlers who enjoy hunting big water. Many privately owned duck blinds are located on the lake and hunters experience varying degrees of success. According to information from a September 26, 1975 News Release from the Louisiana Wildlife and Fisheries Commission; all new duck blinds constructed on Lake Bistineau must be of a floating nature, with none attached to trees by the use of nails, spikes, or any device driven into tree trunks. This regulation went into effect January 1, 1976.

Recreational Boating

Boating on Lake Bistineau is a popular past time, especially during the summer months. Boats commonly used on the lake include small pirogues, jet skis, jon boats, bass and crappie style boats, large inboard ski boats, large runabouts, and houseboats. Several marinas offer houseboat mooring areas where boats are secured throughout the year.

Swimming

Previously, swimming in Lake Bistineau attracted many guests to the Lake Bistineau State Park. Demand for such activities has declined in recent years leading to the closure of the swimming pool at Area 2 of the State Park in 2015. The pool is no longer in operation and has been filled in. There is a designated swimming area and beach located at the Lake Bistineau State Park Area 1 with restroom facilities and picnic areas located nearby; however, it typically receives little use. The State Park did make improvements to the swimming area by clearing the lake bed, adding sand, and adding steps to the swimming area during the 2018 drawdown.

Skiing

Water skiing is allowed on the following designated areas of Lake Bistineau:

- main channel
- the man-made ski road
- Hard Pond
- Blue Pond
- Catfish Pond
- Gregg Lake
- Shreveport Pond
- Teal Slough

Water skiing activity has decreased in recent years on Lake Bistineau. The decline can be partially attributed to the presence of giant salvinia, but the decline began prior to the introduction of the plant. With improvements to the Red River Waterway and other area lakes

in the mid-1990's, pleasure boaters began frequenting other waterbodies closer to large metropolitan areas.

Irrigation

The water from Lake Bistineau is used for residential irrigation purposes by shoreline property owners.